

WHITE PINE BLISTER RUST CONTROL

IN THE

NORTHWESTERN REGION

January 1 to December 31, 1945

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine
Division of Plant Disease Control
Blister Rust Control
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Spokane, Washington

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WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1945

Herman E. Swanson, Regional Leader

FOREWORD

Blister rust control work in the Northwestern Region is organized and administered under several work or financial projects. Under Work Project BLR-1-4, the Bureau of Entomology and Plant Quarantine cooperating with other agencies, is responsible for leadership, coordination and technical direction of the program. The Bureau is also responsible for the direct administration, under Work Project BLR-3-4, of blister rust control operations on state and private lands in cooperation with state and private agencies.

Financial Project BLR-4 covers blister rust control operations on National Forest lands and is administered by the United States Forest Service. Financial Project BLR-5 covers blister rust control operations on National Parks and is administered by the National Park Service of the Department of Interior.

This section of the report summarizes the highlights of the 1945 season and the progress of control in the region as a whole and is followed by reports on the work on state and private lands, National Forest lands, and National Parks. In addition, detailed reports are presented for the several territorial units (operations) and for methods development and control investigations.

FIELD SEASON, 1945

Progress in 1945. During 1945, a total of 51,278 acres were worked including 12,415 acres first working, 17,114 acres second and 21,749 acres third. This represents an increase of 37 percent over 1944 accomplishments. An extremely bad forest fire season and a continued shortage of qualified labor and supervisors prevented the making of substantially greater progress.

Fire Fighting. The bad fire season resulted in considerable loss of time from blister rust control work since the crews were called upon frequently for fire fighting duty. Forest Service crews were the hardest hit with many crews spending as much as 50 percent of their time on fires. Over the blister rust project as a whole it is estimated that 20 to 30 percent of the effective working season was lost because of fire fighting. Since this loss occurred at a time when field conditions are most ideal for ribes eradication and when inexperienced labor had reached the peak of its productivity, the loss is particularly detrimental to the best progress on blister rust.

control. The many interruptions caused by fire calls also have an adverse effect on the efficiency of the workers.

Labor. During April, May and June, 2,352 workers were assembled by the agencies administering blister rust projects. This field force represented a full quota as limited by the amount of funds available up to June 3, 1945. As during the previous war years, teen-aged boys, numbering approximately 1,202, constituted the chief source of labor. The field force was augmented by approximately 925 Mexican Nationals and 175 German Internees employed on the Forest Service project and 50 Civilian Public Service workers employed on the National Parks. While the full quota of workers was obtained at the start of the season, the shortage of labor made it impossible to secure more workers later in the season to take care of replacements.

Infection Conditions. No blister rust infection on white pine or ribes was found in 1945 which would extend the known limits of spread in the Northwestern Region. Heavy infection was found on six ribes plants on the Mammoth area in the northwestern portion of Yellowstone National Park. These infected plants were found on Clematis Gulch and Glen Creek and corroborate the original discovery in this territory in 1944 of one infected plant on Clematis Gulch.

The year 1945 did not appear favorable for blister rust spread and intensification. According to past occurrence of heavy infection in cycles of four years, it was anticipated that 1945 would be another year favorable to considerable spread and intensification of the rust. Weather conditions in the spring were ideal for spread from pine to ribes but the heavy initial infection of ribes was largely dissipated by the long period of dry hot weather continuing from late June to late August in most of the Inland Empire unit of the Northwestern Region. The small amount of ribes infection in the telial stage observed during the normal period of greatest rust spread from ribes to pine indicates that only a nominal amount of new pine infection is expected to have occurred in 1945.

Predictions based on similar observations for 1942, 1943 and 1944 have thus far been substantiated as field surveys and investigations have not revealed any considerable amount of pine infection originating in these years. The failure of ideal conditions for spread of the rust to develop into wavelike proportions which characterized 1937 and 1941 has been a mitigating factor for the slow progress of control work which has fallen far behind schedule during the war.

Methods. In cooperation with the Timber Management Division of the Forest Service in Region One, progress is being made in directing timber cutting and stand improvement practices which will simplify the job of ribes eradication on cut-over lands through the natural suppression or elimination of ribes seed and seedlings by shade or fire. Present recommended practice is to predetermine the potential ribes problem represented in stored seed in the different types on a timber sale area. Where stored ribes seed are not present, cutting practices can be followed without consideration of any ribes problem. Where stored ribes seed are present, this hazard can be minimized or eliminated by employment of the natural forces of either shade or fire,

the particular method being governed by site, volume, composition, age and condition of the stand. The shade factor is used under a system of partial cutting, leaving a well-spaced volume to provide from 45 to 60 percent shade. Under this shade, high mortality of ribes seedlings will result and ungerminated ribes seed will become devitalized within 5 to 7 years. This method being in reality the two or three cut plan, has many merits other than its benefit to the blister rust control problem. It will serve to take trees on the first cut which are susceptible to insect attack and are often lost. The growth increment by the time of the second cut on a well-spaced residual stand will greatly increase the yield. In overmature and decadent stands or in other situations where partial cutting is not warranted, clear cutting followed by broadcast burning and planting is often the most practical solution for re-establishing a white pine stand and minimizing the blister rust control problem. Each of these two methods has the effect of eliminating the greater part of the ribes potential by natural forces before a new white pine crop is started.

Broadcast Spraying. The increased accessibility of cut-over lands and the development of chemicals which may be suitable for destroying upland ribes made it advisable to explore the practicability of broadcast power spraying on cut-over areas supporting high ribes populations. From the standpoint of labor costs, which amounted to one-half to three-quarters of a man-day per acre, and the adaptability of power equipment for this purpose, the method has very high merit. The ultimate use of the method depends upon finding a chemical which will do the job at a reasonable cost. Ammonium sulfamate was used in the trial tests of the method. The present price of this chemical appears too high for extensive use and its effectiveness in killing upland ribes as applied in this test cannot be determined until 1946.

SUMMARY OF PROGRESS

In the commercial white pine area of the Inland Empire, the present control area comprises 2,610,900 acres of which 1,758,770 acres representing 67 percent have been initially worked, 412,836 acres have received second working and 93,915 acres third working. The acreage on maintenance amounts to 602,786 acres or 23 percent of the total control area. Substantial additional acreages are on or approaching maintenance but have not been so classified until the necessary surveys and mop-up work have been performed.

As has been previously reported, the major problem of blister rust control in the Inland Empire involves the protection of new white pine stands becoming established following logging of the mature stands. The curtailed program during the war has not been able to keep pace with this accumulation of acreage. Control investigations for development of more economical and practical methods of eliminating ribes on such areas are being explored with some success.

A summary of blister rust control activities in the Northwestern Region for the calendar year 1945 and for all years is presented in the following tables:

TABLE 1

SUMMARY OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES - 1945

State	Operating Agency	First Working			Second Working			Other Workings			All Workings			Per Acre		Number of Camps	Total Seasonal Employees
		Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Ribes	Man-Days		
Idaho	BEFG	467	102,040	748	3,309	160,165	3,990	7,034	210,877	8,207	10,810	473,082	12,945	44	1.20	8	429
	FS	2,060	2,725,325	4,148	4,485	403,520	7,952	10,774	420,800	19,110	17,319	3,550,126	31,351	143	1.80	22	1,155
	subtotal	2,527	2,827,365	4,896	7,794	563,685	11,942	17,808	631,677	27,317	28,129	4,023,208	44,166	143	1.57	30	1,584
Montana	FS	3,178	340,552	4,482	1,163	77,947	2,593	671	35,121	1,014	5,012	453,620	8,089	91	1.61	7	341
	NPS	356	16,776	842	1,223	11,672	396	603	13,087	465	2,182	41,335	1,110	19	.51	1	25
	subtotal	3,534	357,328	5,324	2,386	89,619	2,989	1,274	48,208	1,479	7,194	495,155	9,199	89	1.28	8	366
Washington	FS	4,787	1,308,011	4,738	6,934	392,767	4,950	1,642	41,788	676	13,363	1,742,566	10,364	130	.78	6	307
	NPS							1,025	46,422	1,200	1,025	46,422	1,200	45	1.17	1	20
	subtotal	4,787	1,308,011	4,738	6,934	392,767	4,950	2,667	88,210	1,876	14,388	1,788,988	11,564	124	.80	7	327
Wyoming	NPS	1,567	95,769	992							1,567	95,769	992	61	.63	1	25
All States	BEFG	467	102,040	748	3,309	160,165	3,990	7,034	210,877	8,207	10,810	473,082	12,945	44	1.20	8	429
	FS	10,025	4,374,369	13,369	12,592	874,234	15,505	13,087	497,709	20,800	35,694	5,746,312	49,674	161	1.39	35	1,843
	NPS	1,923	112,545	1,241	1,628	11,672	396	1,628	59,509	1,665	4,774	184,723	3,302	38	.89	3	80
Total		12,415	4,588,954	15,358	17,114	1,045,071	19,891	21,749	768,095	30,672	51,278	6,403,120	65,921	125	1.29	45	2,656

TABLE 2

ACREAGE WORKED BY LAND OWNERSHIP - 1945

Land Ownership	First Working	Second Working	Other Workings	All Workings
	Acres	Acres	Acres	Acres
National Forest Region 1	8,823	11,679	11,593	32,095
National Park	1,923	1,223	1,628	4,774
Public Domain			327	327
State and Private	1,669	4,212	8,201	14,082
Total	12,415	17,114	21,749	51,278

TABLE 3

SUMMARY OF EXPENDITURES - FEDERAL AND COOPERATIVE - 1945

State	Cooperative Funds		Total Federal Funds	Total All Funds	Federal Funds				Cooperative Funds			Expenditures Ribes Eradication
	Total (Direct and Indirect Aid)	Direct Aid			Entomology and Plant Quarantine		Forest Service	Park Service	Direct Aid			
					3101	3103			State	Private	Total	
Idaho	\$12,398.71	\$11,398.71	\$ 738,059.29	\$ 750,458.00	\$72,613.84	\$103,148.43	\$562,297.02		\$6,287.68	\$5,111.03	\$11,398.71	\$561,722.16
Montana	1,000.00		167,325.14	168,325.14	10,176.34		156,204.48	\$ 944.32				123,026.80
Washington	1,000.00		210,879.26	211,879.26	10,184.84		187,098.77	13,695.65				156,974.42
Wyoming	200.00		8,390.28	8,590.28	2,671.35			5,718.93				5,718.93
Total	\$14,598.71	\$11,398.71	\$1,124,653.97	\$1,139,252.68	\$95,646.37	\$103,148.43	\$905,600.27	\$20,258.90	\$6,287.68	\$5,111.03	\$11,398.71	\$547,442.31

TABLE A

STATUS OF RIBES ERADICATION BY STATES - ALL OWNERSHIPS, DECEMBER 31, 1945
Accumulative Series - Net

State	Total Acres		First Working		Second Working	Other Workings	On Maintenance		Remaining Work	
	White Pine	Control Area (Wh.P. & Prot. Zone)	Acres	Percent	Acres	Acres	Acres	Percent	Unworked Acres	Requiring Rework Acres
Idaho	2,253,464	2,253,464	1,517,283	67	365,721	78,498	489,176	22	736,181	1,028,107
Montana	212,781	212,781	135,897	64	14,223	5,152	78,372	36	76,884	59,525
Washington	152,964	152,964	112,724	74	38,634	17,433	42,888	28	40,240	69,836
Subtotal	2,619,209	2,619,209	1,765,904	67	418,578	101,073	608,436	23	853,305	1,157,468
Wyoming	*240,167	*240,167	23,327	10			9,950	4	216,840	13,377
Colorado	*206,000	*206,000	14,859	7	1,962		8,000	4	191,141	6,859
Subtotal	446,167	446,167	38,186	9	1,962		17,950	4	407,981	20,236
Total	3,065,376	3,065,376	1,804,090	59	420,540	101,073	626,386	20	1,261,286	1,177,704

*Indefinite

TABLE B

SUMMARY OF STATUS OF RIBES ERADICATION BY LAND OWNERSHIP, DECEMBER 31, 1945
Accumulative Series - Net

Land Ownership	Total Acres		First Working		Second Working	Other Workings	On Maintenance		Remaining Work	
	White Pine	Control Area (Wh.P. & Prot. Zone)	Acres	Percent	Acres	Acres	Acres	Percent	Unworked Acres	Requiring Rework Acres
National Forests R-1	1,401,414	1,401,414	1,047,027	75	243,991	48,835	355,328	25	354,387	691,699
National Forests R-2 & 4	*421,000	*421,000	36,619	9	1,962		17,000	4	384,381	19,619
Subtotal	1,822,414	1,822,414	1,083,646	59	245,953	48,835	372,328	20	738,768	711,318
National Parks	22,476	22,476	8,701	39	5,742	7,158	6,600	29	13,775	2,101
Indian Lands	*11,000	*11,000							11,000	
Public Domain	29,409	29,409	16,717	57	5,900	1,366	5,509	19	12,692	11,208
Subtotal--Interior	62,885	62,885	25,418	40	11,642	8,524	12,109	19	37,467	13,309
Total--Federal	1,885,299	1,885,299	1,109,064	59	257,595	57,359	384,437	20	776,235	724,627
State & Private Lands	1,180,077	1,180,077	695,026	59	162,945	43,714	241,948	21	485,051	453,077
Total	3,065,376	3,065,376	1,804,090	59	420,540	101,073	626,386	20	1,261,286	1,177,704

*Indefinite

TABLE C

SUMMARY OF RIBES ERADICATION BY STATES AND OPERATING AGENCIES 1923-1945
Accumulative Series - Gross

State	Operating Agency	First Working			Second Working			Other Workings			All Workings			Per Acre	
		Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Acres	Ribes Destroyed	Man-Days	Ribes	Man-Days
Idaho	BEFQ	780,516	130,051,154	518,645	147,890	21,369,018	140,631	30,172	2,639,285	34,923	968,877	164,069,857	694,089	161	.72
	Forest Service	886,983	300,777,628	843,685	221,178	26,809,237	254,976	48,923	3,704,642	75,647	1,157,084	231,291,507	1,174,308	200	1.01
	Subtotal	1,667,498	430,838,782	1,362,330	369,068	48,178,255	395,507	79,095	6,344,227	110,570	2,115,661	395,251,364	1,868,407	182	.88
Montana	BEFQ	55,469	5,913,038	30,728	1,961	565,047	2,577	648	59,040	777	68,078	6,537,125	34,082	96	.50
	Forest Service	70,875	11,430,405	66,920	10,288	1,067,409	15,937	3,857	217,274	4,362	85,020	12,715,088	87,229	150	1.03
	Park Service	3,553	481,231	4,154	2,202	179,622	1,447	647	36,805	581	6,402	697,758	6,182	109	.97
Washington	BEFQ	139,897	17,824,774	101,812	14,451	1,812,078	19,961	5,133	313,119	5,720	159,500	19,949,971	127,493	125	.80
	Forest Service	48,156	14,422,701	46,892	11,920	2,634,166	12,212	4,681	768,915	4,036	64,767	17,825,782	63,140	275	.98
	Park Service	74,146	14,206,490	54,225	25,341	2,510,574	19,220	6,241	345,912	4,472	105,728	17,062,976	77,917	161	.74
Wyoming	BEFQ	8,254	1,640,507	10,070	4,327	400,913	5,941	6,731	201,199	6,040	19,312	2,242,619	22,051	116	1.14
	Forest Service	130,556	30,262,698	111,187	41,588	5,545,653	37,373	17,653	1,316,026	14,548	189,797	37,131,377	163,108	196	.85
	Subtotal	21,760	1,085,771	6,940							21,760	1,085,771	6,940	50	.32
Colorado	BEFQ	1,567	95,769	7,992							1,567	95,769	7,992	61	.63
	Forest Service	23,327	1,181,640	7,932							23,327	1,181,640	7,932	51	.34
	Subtotal	14,859	410,649	6,292	1,962	86,886	664				16,821	497,535	6,956	30	.41
All States	BEFQ	930,759	151,883,313	609,497	163,733	24,655,117	166,984	35,501	3,467,640	39,736	1,129,993	180,006,070	805,217	159	.71
	Forest Service	1,032,004	226,414,523	964,840	256,807	30,387,220	290,133	59,021	4,267,828	84,481	1,347,832	261,069,571	1,339,454	194	.99
	Park Service	13,374	2,217,607	15,216	6,523	580,535	7,388	7,378	238,004	6,621	27,281	3,036,146	29,225	111	1.02
Total		1,976,137	380,515,443	1,589,553	427,069	55,622,872	453,505	101,900	7,973,472	130,838	2,505,106	444,111,787	2,173,896	177	.87

Cooperative Blister Rust Control on State and Private Lands in 1945
(Work Project BLR-3-4)

Cooperative blister rust control on state and private lands in 1945 was confined to the State of Idaho. Work under this project was performed on the lands in the Clearwater, Potlatch and Priest Lake Timber Protective Associations and was administered by the Bureau of Entomology and Plant Quarantine.

The field project included 8 camps with a total of 429 workers, who for the most part were boys, 16 and 17 years old. The camps and workers were distributed as follows: Clearwater 3 camps, 130 workers; Potlatch 3 camps, 185 workers; Priest Lake 2 camps, 114 workers.

The progress of blister rust control on state and private lands has fallen considerably behind schedule during the war. The supply of labor and funds during this period has been inadequate to keep pace with the urgent needs. The amount of cut-over area requiring ribes eradication is rapidly increasing and the protection of the new crop of white pine on these areas is the major problem facing the control program.

Increased federal allotments for the fiscal year 1946 made possible a slight increase in the control program during 1945. Since these funds were not available until July 1, 1945, it was not possible to secure much additional labor after that time. With the war over, it is anticipated that labor will be available in larger numbers in the spring of 1946 and adequate funds are available to increase the size of the project considerably during the 1946 season.

At the present time 241,949 acres representing 35 percent of the worked area in state and private ownership are classed on maintenance. Considerable additional area is on or approaching a complete protection basis but awaits final checking and whatever mop-up work is required. Although the acreage in state and private ownership on which ribes eradication has been performed during the war period is only 56,600 acres, the majority of this acreage represents highly productive land on which the present stocking of white pine should yield very high volumes at maturity.

The results of the 1945 program and the net progress on state and private lands are summarized in the following tabulations:

1. Allotments

	Fiscal Year 1945		Fiscal Year 1946	
Federal (BLR-3-4)	\$64,870.00		\$210,000.00	
State of Idaho	15,000.00		15,000.00	
Clearwater T.P.A.	6,413.72		6,416.58	
Potlatch T.P.A.	5,174.28		5,174.28	
Priest Lake T.P.A.	4,235.26		4,260.44	
Total	\$95,693.26		\$240,851.30	

2. Expenditures - Calendar Year 1945

Association	State and Private	Federal (BLR-3-4)	Total
Clearwater	\$ 4,659.99	\$ 34,482.34	\$ 39,142.33
Potlatch	1,238.72	41,556.85	42,795.57
Priest Lake	<u>5,500.00</u>	27,109.24	32,609.24
Total	\$11,398.71*	\$103,148.43	\$114,547.14

*State \$6,287.68; Private \$5,111.03

Cash expenditures from cooperative funds deposited with U. S. Treasurer, 1928-1945; State \$193,499.32, Private \$140,691.50, Total \$334,190.82.

3. Cooperative Ribes Eradication in Idaho, 1945

Association	Initial	Rework	Total	Acres Worked	Ribes Per Acre	Man-Days Destroyed	Man-Days
Clearwater	352	2,588	2,940	4,522	247,961	1.54	84
Potlatch	43	3,901	3,944	4,953	71,428	1.26	18
Priest Lake	72	3,854	3,926	3,470	153,693	.88	39
Total	467	10,343	10,810	12,945	473,082	1.20	44

4. State and Private Lands Worked in 1945

	Acres Worked			
State	First	Second	Third	Total
Idaho	611	3,821	7,986	12,418
Montana	1,058	74	215	1,347
Washington		317		317
Total	1,669	4,212	8,201	14,082

5. Progress on State and Private Lands, 1923-1945 (Net Acres)

State	Acres Worked			Acres Unworked	Total Acres in Control Area
	First	Second	Third		
Idaho	651,858	149,391	37,267	464,437	1,116,295
Montana	20,075	2,255	1,766	15,287	35,362
Washington	23,098	11,299	4,681	5,327	28,420
Total	695,026	162,945	43,714	485,051	1,180,077

Blister Rust Control on National Forests in 1945
(Financial Project BLR-4)

Blister rust control work in 1945 was conducted by the Forest Service in Region One on six national forests. Available labor and supervisors were again important factors in building up the project to desired strength. The Forest Service met the labor problem by entering into an agreement with the War Food Administration for the assignment of Mexican Nationals. These were available for the approximate periods of April 4 to May 25 and July 15 to September 25. The total man power of the Forest Service blister rust control program was about 1,843 workers, composed of approximately the following: 743 boys, 925 Mexican Nationals and 175 German Internees.

The number of camps and workers on each forest were as follows:

<u>National Forest</u>	<u>Number of Camps</u>	<u>Number of Workers</u>
Clearwater	5	330
St. Joe	8	415
Coeur d'Alene	7	390
Kaniksu	8	367
Cabinet	2	180
Kootenai	5	161
Total	35	1,843

A late spring, with inclement weather, and a heavy drag on blister rust crews for fire duty, resulted in a serious loss of time from ribes eradication work. The late spring prevented the full utilization of some 900 Mexican Nationals who were secured for the project in April and May. During this period, when it was not possible to perform ribes eradication because of snow conditions and late leafing out of ribes to permit identification, crews were employed on pruning work in heavily infected white pine stands. The removal of cankered limbs in these stands will serve to prevent serious loss of white pine trees. A total of 285,722 trees were treated.

Blister rust crews were used considerably for fighting forest fires on National Forests during July and August. This loss of time was costly to the blister rust project and greatly handicapped progress. The losses were so pronounced that the Forest Service is making an analysis of the effect of fire duty on the blister rust program.

Extension was made in the employment of cutting and silvicultural practices on timber sale areas which will minimize the job of ribes eradication following logging. Several areas were inspected and surveyed to determine the factor of stored ribes seed and to establish a cutting plan to take care of this potential ribes problem.

To meet the increasing complexity of the blister rust control problem and to secure full integration and coordination of the program with the over-all plans in timber management, the Forest Service placed Mr. G. M. LeJarnette

in charge of their blister rust control program in Region One. This assignment greatly strengthened the administration of the program.

The following tabulations summarize the expenditures and progress of work on National Forest lands:

1. Expenditures - Calendar Year 1945

Clearwater	\$115,767.36
St. Joe	195,941.51
Coeur d'Alene	200,854.15
Kaniksu	236,822.77
Cabinet	91,551.98
Kootenai	64,652.50
Total	\$905,600.27

2. Expenditures - 1930-1945

	Regular	Emergency	Total
Clearwater	\$ 956,252.95	\$ 415,454.80	\$1,349,707.75
St. Joe	1,842,995.06	333,340.06	2,226,335.12
Coeur d'Alene	960,700.34	669,809.31	1,630,510.15
Kaniksu	901,126.05	453,055.36	1,359,181.41
Cabinet	354,723.26	258,476.52	613,199.78
Kootenai	150,223.64	28,222.00	158,461.64
Total	\$5,126,026.28	\$2,211,369.55	\$7,337,395.83

3. Ribes Eradication by Forest Service Crews, 1945

Forest	Acres Worked			Man-Days	Ribes Destroyed	Per Acre	
	Initial	Rework	Total			Man-Days	Ribes
Clearwater	320	3,611	3,931	7,892	2,319,658	2.01	717
St. Joe	28	5,452	5,480	10,842	170,926	1.98	31
Coeur d'Alene	1,208	3,894	5,102	9,741	381,558	1.91	75
Kaniksu	5,291	10,878	16,169	12,109	1,920,750	.81	119
Cabinet	583	841	1,424	2,750	211,600	2.63	149
Kootenai	2,595	993	3,588	4,339	242,020	1.21	67
Total	10,025	25,669	35,694	49,674	5,746,312	1.39	161

4. Ribes Eradication on National Forest Lands in Region One, 1923-1945

<u>Forest</u>	<u>Net Acres Worked</u>			<u>Acres Unworked</u>	<u>Total Acres</u>
	<u>First</u>	<u>Second</u>	<u>Third</u>		
Clearwater	150,526	49,795	6,773	49,826	200,352
St. Joe	215,404	76,979	19,961	96,804	312,208
Coeur d'Alene*	306,571	47,764	10,486	53,275	359,846
Kaniksu	262,297	59,687	8,876	94,060	356,357
Cabinet	61,995	7,779	2,584	11,599	73,594
Kootenai	<u>50,234</u>	<u>1,987</u>	<u>155</u>	<u>43,823</u>	<u>99,057</u>
Total	1,047,027	243,991	48,835	354,387	1,401,414

*Includes National Forest land on Mount Spokane Operation.

Blister Rust Control on National Parks in 1945

(Financial Project BLR-5)

Blister rust control work in 1945 was conducted by the National Park Service on Mount Rainier, Glacier and Yellowstone National Parks. Although fire duty interrupted the orderly progress of control work in all Parks and a late spring handicapped early season work in Mount Rainier, the 1945 field season was one of the most satisfactory since the start of the war. Most of the work planned for 1945 was completed. Work on late season fires prevented crews from completing some work in the protection zones and mopping up in areas which supported high ribes populations. This work can be handled in future seasons.

Control work has progressed sufficiently on Mount Rainier and Glacier to permit a detailed projected future plan of control needs. A plan was presented for Mount Rainier in 1944 and a similar plan was prepared and presented in the 1945 report on Glacier.

Ribes eradication work was started in Yellowstone in 1945 on the Mammoth area. After field examinations by members of the National Park Service and the Bureau of Entomology and Plant Quarantine, a decision was reached to include only the Mammoth, Mt. Washburn and Craig Pass units in the control area for Yellowstone National Park. Work plans have been made to start work on the Mt. Washburn area in 1946. Additional surveys are necessary for Craig Pass to determine the extent of the work necessary. Preliminary extensive surveys indicated that a large percentage of the area is free of ribes.

A review was made of the problem of blister rust control in Grand Teton and a recommendation was made against attempting protection of the white pine from blister rust. This recommendation was prompted by experience gained in the protection of *Pinus albicaulis*, the pine species involved in Grand Teton. In advising against blister rust control, the following conditions in the Park appeared to render the establishment of protection impractical if not impossible: (1) high susceptibility of *P. albicaulis*, (2) general distribution of *Ribes petiolare*, a highly susceptible ribes known to infect *P. albicaulis* over considerable distances, (3) rough topography involving hazardous and costly ribes eradication, (4) occurrence of ribes in open upland sites favorable to wide dissemination of sporidia from ribes to pine, and (5) meteorological conditions, characteristic of high elevations, including mists and strong winds, favorable for formation of sporidia and their rapid transport over long distances. Under this combination of conditions, it would be only conjecture as to what would constitute an adequate protection strip. The extension of control areas to include adequate protection zones would take in so much rugged country as to make control costs prohibitive.

No blister rust infection was found which would extend the known limits of blister rust in National Parks in this region. No infection was found in Grand Teton. The finding of six infected ribes plants in Clematis Gulch and Glen Creek of the Mammoth area in Yellowstone corroborates the finding

of blister rust for the first time in this area in 1944. The amount of infection found in 1945 indicates the probable presence of pine infection in the general vicinity.

Detailed reports have been prepared on the progress of blister rust control work in Mount Rainier, Glacier and Yellowstone. The following tabulations represent a brief summary of the work:

1. Allotments and Expenditures by National Park Service

National Park	Calendar Year 1945	<u>Expenditures</u>	All Years
Mount Rainier	\$13,595.65		\$79,531.55
Glacier	944.32		11,149.56
Yellowstone	<u>5,718.93</u>		<u>5,718.93</u>
Total	\$20,258.90		\$96,400.04

2. Ribes Eradication on National Parks, 1945

National Park	<u>Acres Worked</u>			Total	Man-Days	Ribes Destroyed	<u>Per Acre</u>	
	<u>First</u>	<u>Second</u>	<u>Third and Other</u>				<u>Man-Days</u>	<u>Ribes</u>
Mount Rainier			1,025	1,025	1,200	46,422	1.17	45
Glacier	356	1,223	603	2,182	1,110	41,535	.51	19
Yellowstone	<u>1,567</u>			<u>1,567</u>	<u>992</u>	<u>95,769</u>	<u>.63</u>	<u>61</u>
Total	1,923	1,223	1,628	4,774	3,302	183,726	.69	38

3. Gross Acreage Worked on National Parks, 1930 - 1944

National Park	<u>Acres Worked</u>			Total	Man-Days	Ribes Destroyed	<u>Per Acre</u>	
	<u>First</u>	<u>Second</u>	<u>Third and Other</u>				<u>Man-Days</u>	<u>Ribes</u>
Mount Rainier	8,254	4,327	6,731	19,312	22,051	2,242,619	1.14	116
Glacier	3,553	2,202	647	6,402	6,182	697,758	.97	109
Yellowstone	<u>1,567</u>			<u>1,567</u>	<u>992</u>	<u>95,769</u>	<u>.63</u>	<u>61</u>
Total	13,374	6,529	7,378	27,281	29,225	3,036,146	1.07	111

4. Work Status in Net Control Area

<u>National Park</u>	<u>Acres Worked</u>			<u>Acres Unworked</u>	<u>Total Acres Control Area</u>
	<u>First</u>	<u>Second</u>	<u>Third and Other</u>		
Mount Rainier	3,581	3,540	6,511		3,581
Glacier	3,553	2,202	647	1,175	4,728
Yellowstone	1,567			5,600	7,167
Rocky Mountain	_____	_____	_____	<u>7,000</u>	<u>7,000*</u>
Total	8,701	5,742	7,158	13,775	22,476

*Preliminary estimate

BLISTER RUST CONTROL, INLAND EMPIRE, 1945

By

Frank O. Walters

Assistant Regional Leader

The most valuable and extensive white pine timber stands remaining in the United States occur in the Inland Empire section of the Northwestern Region, which comprises northern Idaho, northeastern Washington and western Montana. This section is divided into six operations as follows:

1. Clearwater Operation
2. St. Joe Operation
3. Coeur d'Alene Operation
4. Kaniksu Operation
5. Montana Operation (Cabinet and Kootenai Forests)
6. Mount Spokane Operation (no work since 1941)

Labor Situation. The labor situation continued to constitute a major problem. It was necessary to carry on an intensive recruitment program in the high schools to secure sufficient workers to fill the Bureau camps. The Forest Service used teen-age boys, Mexican Nationals and German Internees. Because of a better understanding of how to supervise and deal with the younger workers, better results were obtained from this group during the current season than in previous seasons. The German Internees were quite satisfactory but were only available until mid-August. Had the Mexicans who were given ribes eradication training in the spring been available again in July, more satisfactory work might have been accomplished. The better workers were retained by the farmers leaving the less capable for blister rust work. Lack of adequate overhead, the language barrier and the inability to adjust themselves to changing working conditions were other factors contributing to the difficulties in securing satisfactory work from Mexican labor.

Accomplishments. The following table shows the accomplishments by classes of labor:

Labor	Number Workers	<u>Ribes Eradication</u>		<u>Canker Elimination</u>	
		Acres	Man-Days	Ribes Trees Treated	Man-Days
Student	1,075	26,489	33,750	1,800,447	600
Mexican National	925	12,065	23,388	3,542,749	285,122
German Internees	173	7,950	5,481	876,198	3,265
Total	2,173	46,504	62,619	6,219,394	285,722
					3,275

Capable and sufficient men to adequately supervise the camps were not available. It was again necessary to train inexperienced men as foremen and camp superintendents.

A bad fire season developed. Nearly one-third of the available work days were spent on fire suppression. Other repercussions of this prolonged siege

of fire duty were a letdown in the efficiency of the workers and a loss of personnel resulting from the dislike of fire fighting assignments. With larger crews in the field there was an increase in accomplishments, 46,504 acres being covered this year compared with 36,624 last year.

Status of work. The severe curtailment of the program during the past several years has caused a serious disruption in the scheduled reworkings on the various operations.

It had originally been expected that it would be possible to rework areas when necessary at properly spaced intervals of from 3 to 5 years. In spite of the urgency of such a follow-up program it has been impossible to execute these successive workings at the proper time on most areas. Hence, only the most critical areas have received second and third eradications. It had been anticipated that losses due to the rust would result where re-eradications were long delayed. This expectation has frequently been borne out. To offset this discouraging aspect two natural factors have tended to alleviate the losses: (1) In some cases the natural regeneration of pine has more than offset the loss from rust. (2) The rapid growth of the young trees has reduced the frequency of fatal infections because of limb length and natural pruning and has helped to shade out regenerating ribes.

Current Year's work. A large portion of this year's work was confined to second and third eradications in plantations and younger age classes of reproduction on burns and logged-over areas.

The Kaniksu and Coeur d'Alene worked largely on plantations and in reproduction areas. Both of these forests have outstanding plantations that are making excellent growths.

A considerable portion of the work on the Clearwater was on cut-over lands. Much of this cut-over is reproducing splendidly to pine. Ribes and white pine regenerating simultaneously shortly after logging usually allow severe rust conditions to become established on these areas before it is possible to initiate eradication measures. At least three thorough workings are usually necessary before control is effected. Even though the first crop of pine may be lost, abundant healthy pine eventually becomes established where there is an adjacent seed source.

On the St. Joe all crews worked in areas of reproduction which became established following burns. On most of these areas control measures were instituted after the disease had become established. While losses due to blister rust have occurred, the stands are open and pine has continued to come in. On many areas some of the older trees are now seeding, thus assuring a continuous seed source.

The Cabinet Forest was concerned primarily with the protection of the Haugan Nursery and adjacent plantations and reproduction areas.

The Kootenai Forest carried on some work in pole stands. A number of excellent stands of pole occur on this forest which will be of vital importance to the lumber economy of the region as the mature stands are removed.

Surveys. All operations carried on comprehensive checking surveys. Practically all worked areas received a check. Most areas not meeting the required standards were reworked.

Checkers capable of adequately performing all phases of the work were difficult to find. By exercising close supervision and working with the checkers, the checking supervisors were able to obtain satisfactory results. Test strips run on four operations showed the checking surveys of the various operations to be on a comparable basis. Only one checker was found to be inadequate in his ability to search out and find ribes.

Lack of individuals capable of carrying on disease survey work has prevented an adequate coverage of the areas on which information is needed. All operations were able to at least make extensive inspections of part of their critical areas.

Operations which have not completed their area classifications gave emphasis to this important phase of the work. Other operations made refinements of some of the more extensively inspected parts of the control area.

Needs. The situation in the younger age classes remains critical. An adequate program allowing properly timed re-eradication over a period of several years is needed to place these stands in a safe condition. Most of the older reproduction and pole stands need only partial workings in the stream type and openings to place them on a maintenance status.

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS IN INLAND EMPIRE, 1945

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 50,054.99
	Regular BLR-3-4	103,149.43
	Subtotal	\$ 153,203.42
State of Idaho Timber Protective Associations	State BLR-3-4	\$ 6,287.68
	Private BLR-3-4	5,111.03
	Subtotal	\$ 11,398.71
Forest Service	Regular BLR-4	\$ 907,600.27
Total		\$1,072,202.40

TABLE 2

CLASSIFIED EXPENDITURES IN INLAND EMPIRE, 1945

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$31,301.39			\$ 31,301.39	\$ 28,101.77	\$ 59,903.16
Sal. temp. men	3,113.55	\$ 24,993.93	\$ 1,796.99	29,904.47	52,431.98	82,336.45
Wages, temp. labs.	8,730.23	61,401.85	9,258.21	79,390.29	539,132.93	668,523.22
Subs. sup.	1,562.79	12,511.34	343.01	14,417.14	157,372.65	171,789.79
Equipment	424.46	1,157.50		1,581.96	42,917.24	44,499.20
Travel & trans.	2,449.42	1,166.00		3,615.42	14,362.78	17,978.20
Other sup.	1,973.15	1,917.81	.50	3,891.46	23,230.92	27,172.38
Total	\$50,054.99	\$103,148.43	\$11,398.71	\$164,602.13	\$907,600.27	\$1,072,202.40

TABLE 3
SUMMARY OF RIBES ERADICATION, 1945
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Plantation	1945-49	989	545	16,607	.55	17
	Cutover	1940-44	2,611	4,196	2,899,122	1.61	1,110
	Plantation	1940-44	205	260	34,187	1.27	167
	Cutover	1920-39	2,668	1,878	155,998	.70	58
	Reproduction	1910-39	1,755	3,539	776,777	2.02	443
	Pole		1,350	549	48,058	.41	36
	Mature		286	5		.02	
	Miscellaneous		240	778	261,833	3.24	1,091
	Stream (1)		393	2,367	283,827	6.10	739
	Total		10,492	14,117	4,476,409	1.35	427
Second	Cutover	1940-44	352	199	7,107	.57	20
	Plantation	1940-44	2,858	2,142	74,139	.75	26
	Cutover	1920-39	1,797	1,995	115,197	1.11	64
	Reproduction	1910-39	7,673	10,815	649,607	1.43	86
	Pole		1,340	1,113	76,036	.83	57
	Mature		757	909	26,107	1.20	34
	Miscellaneous		203	203	4,587	1.00	23
	Stream		1,011	2,119	81,619	2.10	81
	Total		15,891	19,495	1,034,399	1.23	65
Third	Plantation	1940-44	242	300	12,479	1.24	52
	Cutover	1920-39	3,184	4,271	158,683	1.34	50
	Reproduction	1910-39	13,544	20,389	416,609	1.51	31
	Pole		978	871	18,082	.89	18
	Mature		329	289	6,845	.88	21
	Stream (3)		1,844	2,887	95,866	1.57	52
	Total		20,121	29,007	708,586	1.44	32
All Workings	Plantation	1945-49	989	545	16,607	.55	17
	Cutover	1940-44	2,963	4,395	2,906,229	1.48	981
	Plantation	1940-44	3,305	2,702	180,805	.82	37
	Cutover	1920-39	7,649	8,144	429,878	1.06	56
	Reproduction	1910-39	22,872	34,743	1,842,993	1.52	81
	Pole		3,668	2,533	142,176	.69	39
	Mature		1,372	1,203	32,952	.88	24
	Miscellaneous		443	981	266,420	2.21	601
	Stream (4)		3,243	7,373	461,334	2.27	142
	Total		42,334	62,619	6,213,394	1.35	134

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	3	7	65
(3)	333	544	4,345
(4)	336	551	4,410
72 1102 8820			

TABLE 4
SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
INLAND EMPIRE

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
							Man-Days	Ribes
Idaho	First	EQ-Coop.	467	748	102,040		1.60	219
		FS-Reg.	2,060	4,149	2,725,806		2.01	1,323
		Total	2,527	4,897	2,827,846		1.94	1,119
	Second	EQ-Coop.	3,309	3,990	160,165		1.21	48
		FS-Reg.	4,485	7,962	403,520		1.78	90
		Total	7,794	11,952	563,685		1.53	72
	Third	EQ-Coop.	7,034	8,207	210,877	3,329	1.17	30
		FS-Reg.	10,774	19,110	420,800	851	1.77	39
		Total	17,808	27,317	631,677	4,180	1.53	35
	All Workings	EQ-Coop.	10,810	12,945	473,082	3,329	1.20	44
		FS-Reg.	17,319	31,221	3,550,126	851	1.80	205
		Total	28,129	44,166	4,023,208	4,180	1.87	143
Montana	First	FS-Reg.	3,178	4,482	340,552		1.41	107
	Second	FS-Reg.	1,163	2,593	77,947		2.23	67
	Third	FS-Reg.	671	1,014	35,121	165	1.51	52
	All Workings	FS-Reg.	5,012	8,089	453,620	230	1.61	91
	First	FS-Reg.	4,787	4,738	1,308,011		.99	273
Washington	Second	FS-Reg.	6,934	4,950	392,767		.71	57
	Third	FS-Reg.	1,642	676	41,788		.41	25
	All Workings	FS-Reg.	13,363	10,364	1,742,566		.78	130
Total	First	EQ-Coop.	467	748	102,040		1.60	219
		FS-Reg.	10,025	13,369	4,374,369		1.33	436
		Total	10,492	14,117	4,476,409		1.35	427
	Second	EQ-Coop.	3,309	3,990	160,165		1.21	48
		FS-Reg.	12,582	15,505	874,234		1.23	69
		Total	15,891	19,495	1,034,399		1.23	65
	Third	EQ-Coop.	7,034	8,207	210,877	3,329	1.17	30
		FS-Reg.	13,087	20,500	497,709	1,016	1.59	38
		Total	20,121	29,007	708,586	4,345	1.44	35
	All Workings	EQ-Coop.	10,810	12,945	473,082	3,329	1.20	44
		FS-Reg.	35,694	43,674	5,746,312	1,081	1.39	151
		Total	46,504	62,619	6,213,394	4,410	1.35	134

TABLE 5
OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
INLAND EMPIRE

State	Working	Number of Acres Worked																
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total						
		National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	State	Private	Total	National Forest	Public Domain	Total	State	Private	Total	Total
Idaho	First	1,916		64	80	2,060			10	457	467	1,916		1,916	74	537	611	2,527
	Second	3,853			632	4,485	120		1,666	1,523	3,309	3,973		3,973	1,666	2,155	3,821	7,794
	Third	8,693	185	336	1,560	10,774	802	142	3,621	2,449	7,034	9,495	327	9,822	3,957	4,029	7,986	17,808
	Total	14,462	185	400	2,272	17,319	922	142	5,297	4,449	10,510	15,384	327	15,711	5,697	6,721	12,418	28,129
Washington	First	4,787				4,787						4,787		4,787				4,787
	Second	6,617			317	6,934						6,617		6,617		317	317	6,934
	Third	1,642				1,642						1,642		1,642				1,642
	Total	13,046			317	13,363						13,046		13,046		317	317	13,363
Montana	First	2,120			1,058	3,178						2,120		2,120		1,058	1,058	3,178
	Second	1,089			74	1,163						1,089		1,089		74	74	1,163
	Third	456			215	671						456		456		215	215	671
	Total	3,665			1,347	5,012						3,665		3,665		1,347	1,347	5,012
Total	First	8,823		64	1,136	10,025			10	457	467	8,823		8,823	74	1,595	1,669	10,492
	Second	11,559			1,023	12,582	120		1,666	1,523	3,309	11,679		11,679	1,666	2,546	4,212	15,891
	Third	10,791	185	336	1,772	13,087	802	142	3,621	2,449	7,034	11,593	327	11,920	3,957	4,244	8,201	20,121
	Total	31,173	185	400	3,936	35,694	922	142	5,297	4,449	10,510	32,095	327	32,422	5,697	8,395	14,082	48,504

TABLE 6
RIBES SPECIES ERADICATED, 1945
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Plantation (1945-49)	989	8,542	8,046			19	16,607
	Cutover (1940-44)	2,611	219,295	2,679,544	268	15		2,899,122
	Plantation (1940-44)	205	6,221	27,966				34,187
	Cutover (1920-39)	2,668	80,012	75,994	2			158,998
	Reproduction (1910-39)	1,755	42,529	734,246	2			776,777
	Foie	1,350	37,171	10,807		80		48,058
	Mature	286						
	Miscellaneous	240	10,494	251,349				261,833
	Stream	368	128,045	357	705	96,722		283,827
	All Types	10,492	590,297	3,788,299	977	96,817	19	4,475,409
Second	Cutover (1940-44)	352	3,019	4,088				7,107
	Plantation (1940-44)	2,858	39,841	34,288				74,129
	Cutover (1920-39)	1,797	58,214	52,777	3,850	356		112,197
	Reproduction (1910-39)	7,573	314,033	325,955	2,000	6,725	894	649,607
	Foie	1,340	26,080	49,956				75,036
	Mature	757	20,656	5,451				25,107
	Miscellaneous	203	1,925	2,662				4,587
	Stream	1,011	73,708	1,676		6,235		81,619
	All Types	15,891	537,476	476,863	5,850	13,316	894	1,034,399
	Plantation (1940-44)	242	12	12,467				12,479
Third	Cutover (1920-39)	3,184	86,055	72,453	175			158,683
	Reproduction (1910-39)	13,544	184,429	224,802	6,005	174	1,199	416,609
	Foie	978	15,123	2,957	2			18,082
	Mature	329	5,036	1,807				6,945
	Stream	1,844	45,345	47	39,521	10,975		95,882
	All Types	20,121	336,002	314,533	45,703	11,149	1,199	709,566
All Workings	Plantation (1945-49)	989	8,542	8,046			19	16,607
	Cutover (1940-44)	2,963	222,314	2,683,632	268	15		2,906,229
	Plantation (1940-44)	3,305	46,074	74,731				120,805
	Cutover (1920-39)	7,649	224,281	201,214	4,027	356		429,878
	Reproduction (1910-39)	22,872	540,961	1,285,003	8,007	6,899	2,093	1,842,993
	Foie	3,668	78,374	63,720	2	80		142,176
	Mature	1,372	25,694	7,258				32,952
	Miscellaneous	443	12,409	254,011				266,420
	Stream	3,243	305,036	2,090	40,826	113,932		461,394
	All Types	46,504	1,453,775	4,579,895	52,530	121,282	2,112	6,219,394

TABLE 7

SUMMARY OF RIBES ERADICATION, 1923 - 1945
INLAND EMPIRE

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-49	989	545	16,607	.55	17	989	473
	Cutover	1940-44	6,803	8,981	4,054,479	1.32	596	6,803	111,877
	Burn	1940-44	926	535	100,985	.58	109	926	246
	Plantation	1940-44	5,892	8,232	2,183,197	1.40	371	5,892	227
	Cutover	1920-39	81,302	78,065	24,720,140	.96	304	68,487	245,735
	Reproduction	1910-39	600,347	669,811	181,902,284	1.12	303	590,602	167,158
	Pole		361,723	153,335	27,928,044	.42	77	358,471	97,044
	Mature		707,717	298,328	63,236,654	.42	89	569,404	125,179
	Miscellaneous		36,476	31,689	8,111,106	.87	222	34,207	10,376
	Stream (1)		123,969	511,524	64,547,920	2.51	521	128,989	84,435
Second	Total		1,926,144	1,561,108	376,801,416	.81	196	1,788,770	852,130
	Cutover	1940-44	352	199	7,107	.57	20	352	
	Plantation	1940-44	4,026	3,750	245,686	.93	61	4,026	
	Cutover	1920-39	53,635	59,123	12,756,303	1.10	238	53,635	
	Reproduction	1910-39	176,840	214,141	21,673,186	1.21	123	175,199	
	Pole		80,972	48,211	4,435,704	.60	55	80,972	
	Mature		42,684	27,165	2,957,736	.64	69	38,974	
	Miscellaneous		4,198	5,175	880,380	1.23	210	4,198	
	Stream (2)		56,871	87,688	11,999,349	1.57	215	56,871	
	Total		418,878	448,433	54,385,481	1.08	131	412,836	
Third	Plantation	1940-44	755	1,219	63,654	1.61	84	755	
	Cutover	1920-39	18,091	22,805	1,545,249	1.25	85	18,091	
	Reproduction	1910-39	47,809	67,514	3,087,849	1.41	65	47,802	
	Pole		8,934	5,674	379,308	.68	46	8,934	
	Mature		2,504	2,139	217,441	.85	87	2,504	
	Miscellaneous		560	339	27,446	.61	49	560	
	Stream (3)		16,499	24,727	2,413,881	1.50	146	16,499	
	Total		94,522	124,217	7,783,453	1.31	82	94,522	
All Workings	Plantation	1945-49	989	545	16,607	.55	17	989	
	Cutover	1940-44	7,155	9,180	4,061,586	1.28	568	7,155	
	Burn	1940-44	926	535	100,985	.58	109	926	
	Plantation	1940-44	10,873	13,201	2,492,537	1.24	234	10,873	
	Cutover	1920-39	153,028	159,793	39,022,692	1.04	255	140,213	
	Reproduction	1910-39	824,996	951,466	206,663,319	1.15	251	813,003	
	Pole		450,999	207,220	32,742,756	.46	73	447,747	
	Mature		752,905	327,633	66,411,831	.44	88	610,882	
	Miscellaneous		41,234	37,203	9,018,932	.90	219	38,965	
	Stream (4)		196,339	483,999	78,961,090	2.16	402	194,969	
All Workings	Total		2,439,244	2,130,778	439,492,335	.87	180	2,263,321	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	23,138	54,826	1,522,080
(2)	9,298	13,252	242,794
(3)	2,118	2,478	42,720
(4)	34,554	70,556	1,807,594

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923 - 1945
INLAND EMPIRE

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre	
						Man-Days	Ribes
Idaho	sq-Reg.	48,984	20,468	5,042,300	79,864	.42	103
	sq-Coop.	210,681	119,939	21,207,886	199,036	.57	101
	sq-Emerg.	614,942	404,100	95,874,569	213,935	.78	188
	fs-Reg.	412,771	445,967	61,660,594	469,219	1.08	198
	fs-Emerg.	337,869	218,240	56,636,775	125,491	.64	168
	ccc	590,414	661,693	123,729,240	667,303	1.12	210
	Total	2,115,681	1,868,407	365,351,364	1,734,948	.88	182
Montana	sq-Reg.	2,002	3,295	761,710	34,795	1.65	390
	sq-Emerg.	66,076	30,787	5,775,415	1,330	1.47	87
	fs-Reg.	34,833	39,189	3,875,356	8,658	1.12	111
	fs-Emerg.	35,712	35,620	7,367,723	21,638	1.00	206
	ccc	14,475	12,440	1,472,009	6,325	.85	102
	Total	153,098	121,311	19,888,213	72,746	.79	184
	Total	153,098	121,311	19,888,213	72,746	.79	184
Washington	sq-Emerg.	64,757	63,140	17,825,782		.98	275
	fs-Reg.	47,034	38,826	9,562,483		.83	203
	fs-Emerg.	36,366	14,366	4,013,260			110
	ccc	22,322	24,726	3,487,233		1.11	186
	Total	170,485	141,057	34,888,758		.83	213
	sq-Reg.	50,986	23,763	5,804,010	114,659	.47	114
	sq-Coop.	210,681	119,939	21,207,886	199,036	.57	101
Idaho Montana Washington	sq-Emerg.	645,775	498,027	120,475,766	215,265	.77	187
	fs-Reg.	494,638	523,962	95,298,433	467,877	1.06	193
	fs-Emerg.	409,947	266,246	69,017,758	147,129	.65	166
	ccc	627,217	698,838	128,532,432	665,628	1.11	205
	Total	2,439,244	2,130,778	439,492,335	1,807,594	.87	187

TABLE 9
OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923 - 1945
INLAND EMPIRE

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	849,063	210,490	39,855	1,099,408	259,052	1,108,115
	Public Domain	16,362	5,840	1,366	23,568	12,692	29,054
	Subtotal Federal	865,425	216,330	41,221	1,122,976	271,744	1,137,169
	State	233,166	52,251	14,552	299,969	115,061	348,227
	Private	418,692	97,140	22,715	538,547	349,376	768,068
	Subtotal Other	651,858	149,391	37,267	838,516	464,437	1,116,295
	Total	1,517,283	365,721	78,488	1,961,492	736,181	2,253,454
Montana	National Forest	112,229	9,766	2,739	124,734	60,422	172,651
	Public Domain	40			40		40
	Subtotal Federal	112,269	9,766	2,739	124,774	60,422	172,691
	State	734	1		735	173	907
	Private	19,341	2,254	1,766	23,361	15,114	34,455
	Subtotal Other	20,075	2,255	1,766	24,096	15,287	35,353
	Total	132,344	12,021	4,505	148,870	75,709	208,053
Washington	National Forest	85,735	23,735	6,241	115,711	34,913	120,648
	Public Domain	315	60		375		315
	Subtotal Federal	86,050	23,795	6,241	116,086	34,913	120,963
	State	6,832	3,935	2,114	12,881	988	7,820
	Private	16,261	7,364	2,567	26,192	4,339	20,600
	Subtotal Other	23,093	11,299	4,681	39,073	5,327	23,420
	Total	109,143	35,094	10,922	155,159	40,240	149,393
Total	National Forest	1,047,027	243,991	48,835	1,339,853	354,387	1,401,414
	Public Domain	16,717	5,900	1,366	23,983	12,692	29,409
	Subtotal Federal	1,063,744	249,891	50,201	1,363,836	367,079	1,430,823
	State	240,738	86,187	16,666	313,585	116,222	356,954
	Private	454,294	106,758	27,048	588,100	368,829	823,123
	Subtotal Other	695,086	158,945	43,714	901,685	485,051	1,190,077
	Total	1,758,770	412,836	93,915	2,265,521	852,130	2,610,900

TABLE 10
RIBES SPECIES ERADICATED, 1923 - 1945
INLAND EMPIRE

Working	Eradication Type	Gross Acres	Ribes Species								Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes coloradense	Ribes triste	Ribes acerifolium	
First	Plantation (1945-49)	989	8,542	8,046			19				16,607
	Cutover (1940-44)	6,803	356,483	3,684,465	13,516	15					4,054,479
	Burn (1940-44)	926	65,034	35,951							100,985
	Plantation (1940-44)	5,892	594,502	1,588,087	161		447				2,183,197
	Cutover (1920-39)	81,302	8,125,912	16,376,951	81,192	95,961	40,104				24,720,140
	Reproduction (1910-39)	600,347	50,533,918	129,439,132	205,600	1,213,321	505,650	3,518	1,145		181,902,284
	Pole	361,723	14,274,324	12,961,745	65,233	388,599	233,465	302	462	3,914	27,928,044
	Mature	707,717	42,466,087	19,658,542	224,608	403,562	474,605	7,297	26	2,027	63,236,654
	Miscellaneous	36,476	2,554,147	5,394,493	19,825	113,565	29,056				8,111,106
	Stream	123,959	42,763,273	2,009,315	6,395,554	13,188,613	116,220	33,105	21,255	19,584	64,547,920
Second	All Types	1,926,144	161,742,162	191,155,768	7,006,689	15,403,676	1,399,564	44,182	22,888	25,522	376,801,418
	Cutover (1940-44)	352	3,019	4,088							7,107
	Plantation (1940-44)	4,026	141,422	104,264							245,686
	Cutover (1920-39)	53,636	3,644,439	8,998,235	61,458	30,797	21,374				12,756,303
	Reproduction (1910-39)	176,840	7,804,538	13,657,304	61,808	122,201	25,344		2,591		21,673,186
	Pole	80,972	2,182,375	2,184,903	26,767	39,928	1,740				4,435,704
	Mature	42,684	1,503,712	1,386,525	15,768	15,305	36,159		267		2,957,736
	Miscellaneous	4,198	257,330	616,728	5,447	875					680,360
	Stream	55,871	6,981,631	807,873	8,413,008	1,609,766	32,190		155,981		11,999,349
	All Types	418,978	22,515,387	27,759,950	2,582,426	1,813,672	116,807		156,839		64,965,451
Third	Plantation (1940-44)	755	46,619	17,035							63,654
	Cutover (1920-39)	18,091	617,266	907,371	16,448	5,001	143				1,546,249
	Reproduction (1910-39)	47,809	1,292,072	1,766,078	16,618	11,537	1,430		114		3,087,949
	Pole	8,304	195,647	182,362	44	929	6				379,038
	Mature	2,504	128,005	87,700	8		1,728				217,441
	Miscellaneous	560	8,659	18,763		24					27,446
	Stream	16,499	1,187,096	32,053	645,487	531,043	8		18,124		2,413,681
	All Types	94,582	3,475,364	3,011,392	678,628	548,594	3,315		18,238		7,735,438
	Plantation (1945-49)	989	8,542	8,046			19				16,607
	Cutover (1940-44)	7,155	359,502	3,688,553	13,516	15					4,061,686
All Workings	Burn (1940-44)	926	65,034	35,951							100,985
	Plantation (1940-44)	10,873	782,543	1,709,366	161		447				2,495,887
	Cutover (1920-39)	153,088	12,387,617	25,282,557	159,118	131,779	61,621				39,028,692
	Reproduction (1910-39)	824,996	59,630,538	144,862,514	283,426	1,347,059	532,424	3,518	3,650		205,663,319
	Pole	450,999	16,652,347	15,329,030	92,034	429,456	235,211	302	462	3,914	32,743,755
	Mature	752,905	44,097,744	21,132,767	240,384	418,867	518,492	7,297	293	2,027	66,411,831
	Miscellaneous	41,234	2,820,136	6,089,984	25,272	114,484	29,056				9,018,938
	Stream	123,339	50,931,800	2,849,252	9,454,045	15,389,422	148,418	33,105	135,340	19,584	78,261,060
	All Types	2,439,244	187,735,893	221,928,040	10,267,980	17,771,682	1,519,624	44,182	196,785	25,522	439,492,335

BLISTER RUST CONTROL WORK, CLEARWATER OPERATION, 1945

By

H. J. Faulkner, Operation Supervisor

Byron C. Amsbaugh, Forest Officer

INTRODUCTION

The white pine blister rust control program on the Clearwater Operation, during the 1945 season was carried on with five camps operated by the Forest Service and three by the Bureau of Entomology. Student labor again made up the bulk of the crews. Three of the Forest Service camps were manned with student labor, one with German Internees and one with Mexican Nationals. The Bureau camps were manned entirely with teen-age boys.

In general the student workers were improved over last year. This was particularly true in the Forest Service camps where the rate of turnover was less than in previous years, but fire assignments were more numerous and of longer duration. Consequently, the work accomplishment was considerably less than it would have been if the crews could have been undisturbed.

While only a few German Internees were employed on blister rust control their quality of work and output per man-day of employment were above averages for other classes of labor on the forest.

Mexican Nationals were employed from July 20 to September 26. Fire assignments disrupted this program to a large extent but poorer results were obtained by this class of labor than any of the others. Wet weather during the fall plus additional camp maintenance personnel required by the 40-hour week made the cost of this class of labor excessive. The following table shows accomplishments for the different classes of labor:

Labor	Number Workers	Acres	Man-Days	Ribes Eradication
Student	317	5,814	9,502	466,124
Mexican Nationals	123	405	2,248	2,579,505
German Internees	20	652	664	21,980
Total	460	6,871	12,414	3,067,619

ORGANIZATION AND ADMINISTRATION

The organization of field activities was the same as during the 1944 season with no change in previous working agreements with cooperating agencies.

The blister rust control field organization was as follows:

Bureau of Entomology and Plant Quarantine, United States Forest Service

H. J. Faulkner, Operation Supervisor

B. C. Amsbaugh, Forest Officer

J. C. Gonyou, Checker Foreman

Program	Number Camps	Number Workers	Number Checkers
Eq-Cooperative	3	128	2
FS-Regular	5	329	1
Total number employed on blister rust control			460.

The old Reed's Ranch CCC camp again served as a field headquarters, operating and supply base for the Bureau. The Forest Service camps were administered and supplied from the Pierce Ranger Station.

The first camp was established on May 22 and the last camp, for Mexican Nationals, on July 21. All student camps were closed by August 26. The Mexican camp operated until September 26. Considerable difficulty was encountered in establishing camps during late May and June due to heavy rains which made roads practically impassable. To alleviate this condition portable messhalls and some other heavy equipment were left at the camp sites if the same camps were to be occupied the following season. Damage to this type of equipment from weathering is not excessive and is more than offset by the saving in trucking costs.

LOCATION AND DESCRIPTION OF AREAS

Forest Service

Drainage	Township	Range	Section	Work Performed in Sections
Three Mile Creek	37N	5E	27	21, 22, 27, 28, 34
Orogrande Creek	37N	7E	3	2, 3, 4
	38N	7E		25, 32, 33, 35, 36
	38N	8E		30
Sylvan Creek	37N	7E	28	28, 33
Washington Creek	39N	6E	35	25, 36
	38N	6E		1, 2
Sheep Mountain Creek	39N	6E	2	
	40N	6E		36
	40N	7E		30, 31

Bureau of Entomology and Plant Quarantine

*Orofino Creek	36N	5E	10	10, 13, 14, 15, 23
Cow Creek	37N	4E	15	13, 14, 15, 16, 20, 22, 23, 24
Scofield Creek	39N	6E	33	27, 34
Deer Creek	38N	5E	13	13, 24

*Located at Blister Rust headquarters. Combined with Deer Creek camp on July 6.

The Three Mile Creek camp performed third working on Three Mile and Quartz Creek drainages. The area was cut over in 1923 and as a result of previous workings the ribes population was generally light. Due to heavy grazing, many ribes were difficult to find due to their stunted growth and screening by other brush and herbaceous vegetation. Part of the area supported a dense growth of brush resulting in difficult working conditions and slow progress by the crews. It is anticipated that only light spot working will be necessary in the future to bring this area through to maturity with a well-stocked stand of white pine.

The Orogrande Camp performed work on stream and stream zone along Orogrande Creek from the mouth of French Creek to approximately the mouth of Mill Creek. This was third eradication in the stream type. The stream type is surrounded by mature and pole stands of white pine supporting few ribes. Working was performed to remove the heavier concentrations of ribes in the stream type and stream zone. This working should suffice until the adjoining stands are logged.

The Sylvan Creek Camp performed second working in plantations established in 1939 and 1940. The area received a heavy burn in 1931 and ribes populations have stabilized. Due to the heavy demand for fire fighting and the resultant loss of man power on ribes eradication, it will require a portion of another camp season to complete this area. An extension of the protection boundary above the planted area will also be necessary to insure adequate protection of the plantation.

Washington Creek Camp performed both chemical and hand eradication in an advanced reproduction stand which became established after a 1914 burn and 1922 reburn. This was second working of the upland. Ribes concentrations were fairly heavy and working conditions were difficult due to windfalls, brush and density of reproduction. Another working will be necessary to insure protection of the area.

The Sheep Mountain Camp performed initial work in area cut over in 1943. A 50-acre slash fire occurred in the fall of 1943. This burn was clear cut in 1944. The area supported a very heavy concentration of ribes. A long period of germination is not anticipated in the burned area and another working in two or three years may suffice for protection.

The Orofino Creek crew, working out of Blister Rust Control Headquarters, performed first and second workings in cut-over areas. Heavy cutting and considerable disturbance of the soil at the time of cutting caused numerous ribes to germinate and additional workings will be necessary to establish protection. Working conditions are generally favorable on these recently cut-over areas due to the fact that ribes are small and a heavy brush cover has not had time to become established since logging. However, due to the small size of the ribes a considerable amount of searching time is necessary.

The Cow Creek Camp worked on lands which were logged from 1930 to 1934. Working conditions were generally difficult due to heavy brush, windfalls and large ribes. Due to the small control programs since 1937, follow-up workings were delayed on this area resulting in considerable blister rust damage.

Working was also more costly and difficult due to the heavy brush cover and windfalls which were not present to such an extent at the time the rework should have been done.

The Scofield Camp performed second hand eradication on upland type and third chemical eradication of *Ribes petiolare* on stream type. Working conditions are difficult on this area due to the size and density of brush and reproduction. The stand was established following a 1914 and 1922 burn. First working was done in the years 1934 to 1937 but due to a reduction in the program after 1937 reworking which should have followed in 3 years was delayed until 1943. As a result of this delay considerable damage has resulted which is more serious in this age class than in younger stands.

The Deer Creek Camp performed second eradication on a 1935 cut-over area. Working conditions were quite favorable but numerous small ribes in association with heavy vegetation make eradication difficult. A third working will be necessary on parts of the area to insure protection.

METHODS AND EQUIPMENT

The same methods were used this year as during the 1944 season. The working of three to four 3-man crews together under the supervision of a straw boss has proven to be the most satisfactory method for the student class of labor.

Several new items of camp equipment were used this year including portable tent floors and frames, portable bathhouse and improved type of stove for heating crew quarters.

STATUS OF CONTROL

Present established young stands on the Clearwater National Forest could be placed on maintenance within the next three or four years with approximately the same size program as this year if a high quality of labor and supervision were available.

Increased cutting on National Forest land, burned-over area and timber stand improvement projects in the postwar years may necessitate a large sized program for several additional years. Better correlation of timber cutting practices and blister rust control will undoubtedly reduce the amount of work necessary on cut-over areas. In the event of a light, forestwide harvest cutting the blister rust program may need to be larger for a few years to insure that all ribes concentrations developing from logging are eradicated at the proper time.

The planned objective is to place existing young stands of white pine on a maintenance basis at an early date to avoid periodic fluctuations in the size of the organization required to protect additional areas coming into the work program.

From an organizational and work accomplishment standpoint a stable program of sufficient size to warrant protection at the proper time is desirable.

Status of control on the Clearwater Timber Protective Association lands as a result of large-scale logging operations and small control programs continues to be unfavorable as described in previous reports. The amount of unworked cut-over land is increasing from year to year. The need for initial work to protect the new white pine coming in on these areas plus the necessary rework in older reproduction stands resulting from earlier cutting continues to be far in excess of the present eradication program.

CHECKING AND SURVEYS

Checking was carried on this year with three teen-age boys working under the constant supervision of a checking foreman. The boys had at least one year previous eradication experience and with intensive training and constant supervision they performed satisfactory work.

After the close of the regular season an advance survey was run on 2,080 acres of recently cut-over land. In addition to ribes data, information was taken on white pine stocking and residual stand.

Pine disease surveys consisted of inspection by the permanent personnel throughout the season.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945 CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 15,181.34
	Regular BLR-3-4	34,482.34
	Subtotal	\$ 49,663.68
State of Idaho Clearwater Timber Protective Association	State BLR-3-4	2,571.66
	Private BLR-3-4	2,083.33
	Subtotal	\$ 4,659.99
Forest Service	Regular BLR-4	\$115,767.36
Total		\$170,091.03

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945

CLEARWATER OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$ 8,808.79			\$ 8,808.79	\$ 4,497.55	\$ 13,306.34
Sal. temp. men	1,331.09	7,556.62	680.25	9,367.96	8,398.78	17,766.74
Wages, temp. labs.	3,159.87	21,747.70	3,656.23	28,543.80	72,793.34	101,342.14
Subs. supplies	810.13	3,845.71	343.01	4,998.85	21,814.46	26,813.31
Equipment	161.58	414.81		576.39	2,775.18	3,351.57
Travel & transp.	588.59	377.52		966.11	3,260.00	4,226.11
Other supplies	321.29	739.98	.50	1,061.77	2,223.05	3,284.82
Total	\$15,181.34	\$34,482.34	\$4,659.99	\$54,323.67	\$115,767.36	\$170,091.03

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
CLEARWATER OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Cutover	1940-44	514	2,325	2,631,741	4.52	5,120
	Cutover	1920-39	158	205	12,464	1.30	79
	Total		672	2,530	2,644,205	3.76	3,935
Second	Cutover	1920-39	1,123	1,093	57,810	.97	51
	Reproduction	1910-39	1,173	2,981	175,296	2.54	149
	Total		2,296	4,074	233,106	1.77	102
Third	Cutover	1920-39	995	1,400	54,929	1.41	55
	Reproduction	1910-39	2,236	3,493	102,446	1.56	46
	Stream (3)		672	917	32,933	1.36	49
	Total		3,903	5,810	190,308	1.49	49
All Workings	Cutover	1940-44	514	2,325	2,631,741	4.52	5,120
	Cutover	1920-39	2,276	2,698	125,203	1.19	55
	Reproduction	1910-39	3,409	6,474	277,742	1.90	81
	Stream (4)		672	917	32,933	1.36	49
	Total		6,871	12,414	3,067,619	1.81	446

Chemical work included above:

	Acres		Gallons Man-Days Spray	
(3)	45	253	3,651	
(4)	45	253	3,651	

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
CLEARWATER OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Gallons Spray	Per Acre	
							Man-Days	Ribes
Idaho	First	EQ-Coop.	352	632	75,122		1.80	213
		FS-Reg.	320	1,898	2,569,083		5.93	8,028
		Total	672	2,530	2,644,205		3.76	3,935
	Second	EQ-Coop.	1,573	2,323	109,510		1.48	70
		FS-Reg.	723	1,751	123,596		2.42	171
		Total	2,296	4,074	233,106		1.77	102
	Third	EQ-Coop.	1,015	1,567	63,329	2,800	1.54	62
		FS-Reg.	2,888	4,243	126,979	851	1.47	44
		Total	3,903	5,810	190,308	3,651	1.49	49
	All Workings	EQ-Coop.	2,940	4,522	247,961	2,800	1.54	84
		FS-Reg.	3,931	7,892	2,819,658	851	2.01	717
		Total	6,871	12,414	3,067,619	3,651	1.81	446

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
CLEARWATER OPERATION

State	Working	Acres Worked											
		By Forest Service				By Bureau of Entomology and Plant Quarantine				Total			
		National Forest	State	Private	Total	National Forest	State	Private	Total	National Forest	State	Private	Total
Idaho	First	256	64		320		10	342	352	256	74	342	672
	Second	401		322	723	120		1,453	1,573	521		1,775	2,296
	Third	1,840	72	976	2,888		65	950	1,015	1,840	137	1,926	2,063
	Total	2,497	136	1,298	3,931	120	75	2,745	2,940	2,617	211	4,043	4,834

TABLE 6

**RISES SPECIES ERADICATED, 1945
CLEARWATER OPERATION**

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	
First	Cutover (1940-44)	514	123,038	2,508,451	252	2,631,741
	Cutover (1920-39)	193	8,965	3,557	2	12,464
	All Types	672	131,943	2,512,008	254	2,644,205
Second	Cutover (1920-39)	1,123	13,862	40,098	3,850	57,810
	Reproduction (1910-39)	1,173	144,196	29,100	2,000	175,296
	All Types	2,296	158,058	69,198	5,850	233,106
Third	Cutover (1920-39)	995	8,957	45,797	175	54,929
	Reproduction (1910-39)	2,236	26,586	69,920	5,940	102,446
	Stream	672	6,743		26,190	32,933
All Workings	All Types	3,903	42,286	115,717	32,305	190,308
	Cutover (1940-44)	514	123,038	2,508,451	252	2,631,741
	Cutover (1920-39)	2,276	31,724	89,452	4,027	125,203
	Reproduction (1910-39)	3,409	170,782	99,020	7,940	277,742
	Stream	672	6,743		26,190	32,933
	All Types	6,871	332,287	2,696,923	38,409	3,067,619

TABLE 7

**SUMMARY OF RISES ERADICATION, 1929-1945
CLEARWATER OPERATION**

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	2,987	6,049	3,690,853	2.03	1,236	2,987	24,143
	Plantation	1940-44	60	232	134,749	3.87	2,246	60	
	Cutover	1920-39	35,848	36,357	13,761,086	1.01	384	23,607	32,812
	Reproduction	1910-39	71,329	108,331	33,428,751	1.52	469	71,329	4,248
	Pole		29,925	17,137	3,828,386	.57	128	29,925	6,331
	Mature		219,289	99,880	23,422,354	.46	107	181,949	40,910
	Miscellaneous		5,852	3,900	1,700,804	.67	291	5,852	7,819
	Stream (1)		42,353	78,124	14,058,124	1.84	332	42,353	13,675
Second	Total		407,643	350,010	94,025,107	.86	231	358,062	129,936
	Plantation	1940-44	60	194	15,587	3.23	260	60	
	Cutover	1920-39	30,343	29,534	7,902,339	.97	260	30,343	
	Reproduction	1910-39	23,462	36,011	3,518,600	1.53	150	23,462	
	Pole		13,995	7,892	1,110,792	.56	79	13,995	
	Mature		16,067	7,801	811,832	.49	51	14,167	
	Miscellaneous		511	573	371,107	1.12	726	511	
	Stream (2)		23,780	26,966	3,329,143	1.13	140	23,780	
Third	Total		108,218	108,971	17,059,400	1.01	184	108,218	
	Cutover	1920-39	10,832	12,568	922,096	1.14	85	10,832	
	Reproduction	1910-39	5,646	7,698	379,216	1.36	67	5,646	
	Stream (3)		3,260	3,672	329,107	1.13	101	3,260	
All Workings	Total		19,738	23,738	1,630,419	1.20	85	19,738	
	Cutover	1940-44	2,987	6,049	3,690,853	2.03	1,236	2,987	
	Plantation	1940-44	120	426	150,836	3.55	1,253	120	
	Cutover	1920-39	77,023	78,259	22,595,521	1.02	293	64,782	
	Reproduction	1910-39	100,437	152,040	37,386,567	1.51	372	100,437	
	Pole		43,920	25,029	4,939,178	.57	112	43,920	
	Mature		235,356	107,681	24,234,186	.46	103	196,116	
	Miscellaneous		6,363	4,473	2,071,911	.70	326	6,363	
	Stream (4)		62,393	109,762	17,715,374	1.57	256	69,393	
	Total		535,599	482,719	112,714,926	.90	210	484,118	

Chemical work included above:

	Gallons	
Acres	Man-Days	Spray
(1) 15,027	31,179	794,484
(2) 5,875	8,142	119,985
(3) 750	1,196	18,663
(4) 21,652	40,516	933,132

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1945
CLEARWATER OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Ribes
Idaho	EQ-Reg.	4,412	5,273	1,129,228	79,864	1.20	256
	EQ-Coop.	43,766	38,544	5,756,715	138,922	.88	132
	EQ-Emerg.	133,970	125,277	30,398,093	136,847	.94	227
	FS-Reg.	110,061	102,375	28,294,225	144,887	.93	257
	FS-Emerg.	55,908	45,382	14,895,022	24,015	.81	266
	CCC	187,482	165,868	32,241,643	408,597	.88	172
	Total	535,599	482,719	112,714,926	933,132	.90	210

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929 - 1945
CLEARWATER OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	150,526	49,795	6,773	207,094	49,826	200,352
	Public Domain	3,680	628	12	4,320	350	4,030
	Subtotal Federal	154,206	50,423	6,785	211,414	50,176	204,382
	State	63,802	13,762	1,322	78,886	26,456	90,258
	Private	140,054	42,133	11,631	193,818	53,306	193,360
	Subtotal	203,856	55,895	12,953	272,704	79,762	283,618
	Total	358,062	106,318	19,738	484,118	129,938	488,000

TABLE 10

RIBES SPECIES ERADICATED, 1929-1945
CLEARWATER OPERATION

Working	Eradication Type	Gross Acres	Ribes Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes triste	
First	Cutover (1940-44)	2,987	204,248	3,473,105	13,500				3,690,853
	Plantation (1940-44)	60	32,168	102,581					134,749
	Cutover (1920-39)	35,848	2,326,615	11,322,029	72,862	28,370	11,210		13,761,086
	Reproduction (1910-39)	71,329	7,928,610	25,245,707	75,977	47,326	131,131		33,428,751
	Pole	29,925	2,510,390	1,278,821	31,617	6	7,090	462	3,828,386
	Mature	219,289	16,261,450	6,795,503	197,832	107,922	59,621	26	23,422,354
	Miscellaneous	5,852	338,812	1,329,256	17,838	114	14,284		1,700,804
	Stream	42,353	10,239,770	324,583	2,766,543	701,834	25,394		14,058,124
	All Types	407,643	39,842,063	49,872,085	3,176,169	885,572	248,730	488	94,025,107
	Plantation (1940-44)	60	6,747	8,840					15,587
Second	Cutover (1920-39)	30,343	1,053,331	6,777,133	59,693	106	12,076		7,902,339
	Reproduction (1910-39)	23,462	991,049	2,503,913	23,598	4	36		3,518,600
	Pole	13,995	545,661	548,785	16,095	1	250		1,110,792
	Mature	16,067	395,208	400,473	15,768	116		267	811,832
	Miscellaneous	511	19,861	345,799	5,447				371,107
	Stream	23,780	1,893,616	516,470	826,524	76,716	9,141	6,676	3,329,143
	All Types	108,218	4,905,473	11,101,413	947,125	76,943	21,503	6,943	17,059,400
Third	Cutover (1920-39)	10,832	159,590	745,895	16,468		143		922,096
	Reproduction (1910-39)	5,646	171,244	200,084	7,874		14		379,216
	Stream	3,260	195,521	2,573	108,197	22,816			329,107
	All Types	19,738	526,355	948,552	132,539	22,816	157		1,630,419
	Cutover (1940-44)	2,987	204,248	3,473,105	13,500				3,690,853
All Workings	Plantation (1940-44)	120	38,915	111,421					150,336
	Cutover (1920-39)	77,023	3,539,536	18,845,057	149,023	28,476	23,429		22,585,521
	Reproduction (1910-39)	100,437	9,090,903	27,949,704	107,449	47,330	131,181		37,326,567
	Pole	43,920	3,056,051	1,827,606	47,712	7	7,340	462	4,939,178
	Mature	235,356	16,656,658	7,195,976	213,600	108,038	59,621	293	24,234,186
	Miscellaneous	6,363	358,673	1,675,555	23,285	114	14,284		2,071,911
	Stream	69,393	12,328,907	843,626	3,701,264	801,366	34,535	6,676	17,716,374
	All Types	535,599	45,273,891	61,922,050	4,255,833	985,331	270,390	7,431	112,714,926

BLISTER RUST CONTROL WORK, ST. JOE OPERATION, 1945

By

F. J. Heinrich, Operation Supervisor

D. J. Moore, Pathologist, U. S. Forest Service

W. F. Painter, Assistant Operation Supervisor

F. A. Moore, Unit Supervisor, U. S. Forest Service

INTRODUCTION

The St. Joe operation comprises 884,925 acres of white pine type in the north Idaho counties of Benewah, Shoshone and Clearwater. Of the total area 27 percent is cut-over, 32 percent reproduction, 15 percent pole, 25 percent mature and 1 percent miscellaneous types.

At the close of the 1945 field season 538,530 acres have been worked initially and 179,633 acres reworked. Of the total acreage worked 151,373 acres have been placed in the maintenance classification.

ORGANIZATION AND ADMINISTRATION

Control activities on the St. Joe operation were organized in accordance with agreements between federal, state and private agencies and in accordance with provisions of the Appropriations Act. Personnel of the Bureau of Entomology and Plant Quarantine provided assistance in the over-all planning, coordination and technical direction of the program on lands of all ownership and administered the work of the three camps on state and private lands. The Forest Service administered the work of eight camps on National Forest lands. Three were teen-age boy camps which they maintained only through June 30. On July 1 the personnel from these camps were transferred to the Bureau for the remainder of the season.

The blister rust control 1945 field organization was as follows:

Bureau of Entomology and Plant Quarantine

U. S. Forest Service

F. J. Heinrich, Operation Supervisor

D. J. Moore, Forest Officer

W. F. Painter, Assistant Operation Supervisor
in charge of checking

F. A. Moore, Unit Supervisor

H. W. Seaman, Unit Supervisor

<u>Program</u>	<u>Number Camps</u>	<u>Number Workers</u>	<u>Number Checkers</u>
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*E.Q. - Cooperative	3	185	3
*F.S. - Regular	8	365	4

Total number employed on blister rust control - 550

*Bureau financed 1 teen-age boys camp through June 30. The 3 teen-age boys camps financed by the Forest Service through June 30 were transferred to Bureau funds on July 1.

Field headquarters at Clarkia, Idaho maintained by the Bureau was used as an operating base for all Bureau and some Forest Service activities. Warehousing and supplying of subsistence for the Forest Service camps were handled through the Clarkia Ranger Station warehousing facilities.

Fully realizing the seriousness of the blister rust control problem the Bureau, Forest Service and all cooperating agencies made an exerted effort in recruiting laborers and supervisory personnel for field work. The laborers obtained were teen-age boys and Mexican Nationals.

Recruitment for the Bureau camps was handled by the Blister Rust Control Office in Spokane, Washington. The Forest Service teen-age boys were secured locally, through forestry schools and by recruitment in the various regions. Inexperienced boys 16 years of age comprised the majority of workers in the boys camps. Work accomplishments in output and efficiency were comparable to that of last year. Personnel turnover and the short school vacation resulted in a short employment period for teen-age employees, the average being 21 days for the season.

Mexican Nationals were secured through the War Food Administration for blister rust control work in the Forest Service camps. One hundred thirty reported in early April and were engaged in pruning for removal of blister rust cankers. They were transferred to the beet fields in mid-May and returned for blister rust work in early July and continued until September 20.

The maximum number of Mexican Nationals employed on blister rust control work after July was 340. These men averaged about 25 years of age and adapted themselves well to woods work and camp life. Accomplishments on canker removal work were very good. Results on actual ribes eradication were not too satisfactory. The two primary reasons being, (1) the lack of adequate supervision and (2) the amount of time spent on fire suppression. The need for adequate supervision was realized and an early exerted effort was made to fill these needs but the men could not be secured.

Accomplishments on blister rust control field work by different classes of labor are shown in the following table:

Labor	<u>RIBES ERADICATION</u>			<u>CANKER ELIMINATION</u>		
	Number Workers	Acres	Man-Days	Ribes	Trees Treated	Man-Days
Student	185	4,397	6,680	82,347		
Mexican National	340	4,527	9,116	160,007	135,325	2,334

LOCATION AND DESCRIPTION OF AREAS

Cooperative camps on state and private land.

1. Squaw Meadow area, camp 201, established May 21, closed August 25.

Area located in Squaw, Shattuck and Lindley Creek drainages in secs. 21, 22, 27, 28, 29, 32, 33 and 34, T. 40 N., R. 1 E. This block comprises

over 3,000 acres of well-stocked white pine reproduction established in 1918. Of this total only 1,886 acres required working. Ribes were small and scattered averaging approximately 12 per acre. Satisfactory efficiency was accomplished by the crew this summer.

Infection is general throughout this area and some damage from the rust has occurred. Fortunately, however, many of the trees are producing seed and young trees are being established. Another season's work still remains from this camp site.

2. Gold Center area, camp 202, established May 9, closed August 25.

Worked area located in secs. 1, 2, 11, 12, 13, 14 and 23, T. 42 N., R. 2 E. All area worked was third working and comprised 832 acres of open reproduction, 258 acres pole and 168 acres of stream type. Ribes removed averaged 32 per acre. One of the early known infection centers lay in the NW. $\frac{1}{4}$ of the NW. $\frac{1}{4}$, sec. 12, extending from the stream to five chains in the upland type. This is a pole stand and the infection heavy with many trunk cankers present.

This camp was established by the Forest Service and manned by Mexican Nationals from May 9-18 and by teen-age boys after June 9. The Forest Service financed the camp through June 30. On July 1 the camp was taken over by the Bureau of Entomology and Plant Quarantine and carried for the remainder of the season.

3. Hidden Creek area, camp 204, established April 6, closed August 4.

Worked area located in secs. 21, 26, 27, 28, 29 and 35, T. 42 N., R. 1 E. Area worked from this camp consisted of 584 acres of white pine reproduction, third working. The average number of ribes removed was 35 per acre.

Considerable difficulty was encountered in obtaining efficient work on this area. This was due primarily to poor supervision.

This camp was established by the Forest Service as camp 252 and manned by Mexican Nationals engaged in canker removal work from April 6 to May 19. Boys occupied this camp from June 1 to June 30 under Forest Service supervision. The Bureau took over the camp and handled it through the remainder of the season.

Infection is general throughout the area. Canker removal work was performed on areas in secs. 23, 26, 27 and 34, T. 42 N., R. 1 E.

Forest Service Camps on Federal Land

1. Old Ranger Station Area, camp 251, established April 6, closed September 26.

Work area located in secs. 1, 2, 11, 12, 13, 14 and 24, T. 42 N., R. 1 E., and sec. 7, T. 42 N., R. 2 E. A total of 1,886 acres upland and 177 acres stream type were worked. This camp was occupied early in April by Mexican Nationals who worked mostly on removal of blister rust cankers.

Boys under Forest Service supervision manned the camp from June 1-30. The Bureau took over and ran the camp from July 1-15. On July 15 the boys were transferred to other camps. Mexican Nationals occupied the camp on July 16 and worked from this location for the remainder of the season.

Canker removal work was performed in secs. 11, 12, 13 and 14, T. 42 N., R. 1 E.

2. Marble Creek Unit.

The following areas designated as Bussel, Toles, Cranberry and Norton Creeks constitute a portion of the Marble Creek Unit. This unit comprises 6,420 acres of thrifty well-stocked white pine reproduction which was established following a fire in 1922. Infection is general throughout the stand and some damage has taken place. It appears that the trees lost will be replaced through natural seeding which is already taking place.

3. Bussel Creek Area, camp 253, established June 11, closed September 19.

Worked area lay in secs. 25, 35, and 36, T. 44 N., R. 2 E., and secs. 3 and 4, T. 43 N., R. 2 E. A total of 571 acres of open reproduction was worked by this camp, all being third working.

4. Toles Creek Area, camp 254, established July 4, closed September 19.

Worked area located primarily in Bear and Little Bear Creek drainages, secs. 13, 23, 24, 25 and 26, T. 44 N., R. 2 E., and sec. 19, T. 44 N., R. 3 E. Area worked consisted of 835 acres reproduction and 145 acres cut-over, all third working.

5. Cranberry Creek Area, camp 255, established July 9, closed September 19.

Worked area lay in secs. 25 and 36, T. 44 N., R. 2 E. and secs. 19, 20, 29, 30, 31 and 32, T. 44 N., R. 3 E. A total of 1,121 acres were worked all being third working. The ribes averaged 24 per acre.

6. Norton Creek Area, camp 256, established July 17, closed September 19.

Worked area located in secs. 25, 26, 27, 34, 35 and 36, T. 44 N., R. 2 E. Area worked consisted of 582 acres of reproduction all being third working.

7. Lucky Swede Creek Area, camp 257, established July 10, closed September 22.

Worked area located in sec. 5, T. 46 N., R. 6 E. and secs. 26, 27 and 34, T. 47 N., R. 5 E. Twenty-eight acres of first working and 63 acres of second working in sec. 26. The remainder of work area was third working in open reproduction type.

This area is part of the North Fork of the St. Joe River unit which is made up of several scattered but thrifty well-stocked plantations established in 1914-15. In most cases the white pine appears only on the north and west exposures. Yellow pine has been planted on the dry south slopes.

Working conditions on this unit are difficult due to the presence of windfalls, brush density and in some cases steep rocky slopes.

Although blister rust has been established in this area for several years there has been little intensification and no serious damage has resulted.

METHODS AND EQUIPMENT

Standard approved methods for hand ribes eradication used last year were applied again throughout the season. In most cases three men worked in each lane with a rework man directly behind. Crews were worked in gang formation with a straw boss in direct charge of three to four crews. This method provided the necessary close supervision which was needed for both the teen-age boys and Mexican Nationals.

The use of Atlacide for chemical ribes eradication was confined to mop-up work and the spraying of a few isolated patches. Ammonium sulfamate was used in treating 40 acres on Bechtel Creek and 188 acres on St. Maries River near Clancia, Idaho, all being stream type. Atlacide was used only on Ribes petiolare while the ammonium sulfamate was applied on R. petiolare, R. lacustre and R. inermis. One hundred fifty man-days were spent in treating the 228 acres. Had hand eradication methods been used it would have taken over 300 man-days.

A training school was held for blister rust supervisory personnel in May. These men were given complete schooling in all phases of eradication work. Straw bosses and crew men were given thorough training on the job.

All blister rust supervisory personnel and crew men were given intensive training in the use of tools and fire suppression. A fire training school was held at each camp with the exception of the Bureau camp 201 located at Elk River, Idaho.

CHECKING

The method of checking areas by working two teen-age boys together along a check strip was continued during the 1945 season. This method was described in detail under "checking" in the 1944 St. Joe Operation report.

Three checkers from the 1944 field season reported for work by mid-June. Three additional boys were trained to work with the three experienced boys. One checker foreman assisted in the direction of the work until mid-July.

Generally the check on areas worked by the teen-age boys conformed with the established standards. The work performed by Mexican laborers was not up to standard quality. Practically all the areas worked will require rework to place them in a satisfactory status.

A total of 9,424 acres worked during 1945 were inspected during the season. Approximately 3,000 acres classified as maintenance and post check within the 1945 camp areas were inspected prior to any work by the crews.

PINE AND DISEASE SURVEY

A six-man survey crew subsequent to the eradication season, inspected a number of questionable white pine areas to secure more detailed information relative to stocking and working conditions. Parallel strips were run at 10-chain intervals. A running count of white pine along a 13.2 foot strip was tallied and in addition the presence of white pine and other species was tallied on a four milacre quadrat at the end of each chain. Working conditions were noted as light, medium and heavy depending upon the number and size of ribes and brush density. The data will supplement random inspections and will aid in properly appraising the areas for future blister rust control work.

A total of 9,020 acres were inspected at a cost of 11 cents per acre. The project was financed from regular Forest Service funds.

Extensive disease surveys were conducted in the Ramskull, East Fork Potlatch, Charlie Creek and Hog Meadows areas.

Results of the surveys are shown in the following summaries:

RAMSKULL CREEK - T. 43 N., R. 2 W., Secs. 7 and 18

Chains of survey strip	43
Number of trees examined	285
Number of trees infected	85
Percent of trees infected	29
Total number of cankers	121
Percent of infected trees with trunk cankers	55

Majority of cankers were on 1940 and 1941 wood.

EAST FORK POTLATCH CREEK - T. 40 N., R. 1 E., Sec. 4

Chains of survey strip	20
Number of trees examined	143
Number of trees infected	87
Percent of trees infected	60
Total number of cankers	139
Percent of infected trees with trunk cankers	71

Majority of cankers were on 1937, 1938 and 1939 wood.

CHARLIE CREEK - T. 43 N., R. 2 W., Secs. 10, 15, 21 and 22

Number of trees examined	135
Number of trees infected	18
Percent of trees infected	13
Total number of cankers	25
Percent of infected trees with trunk cankers	66

Majority of cankers on 1939 and 1940 wood.

HOG MEADOWS AREA - T. 40 N., R. 1 W., Sec. 2

Chains of survey strip	14
Number of trees examined	125
Number of trees infected	10
Percent of trees infected	8
Total number of cankers	10
Percent of infected trees with trunk cankers	40

Majority of cankers on 1940 wood.

Random inspections were made in Big Creek in T. 47 N., R. 3 E., and Mowat Creek in T. 46 N., R. 3 E. A very definite increase in the amount of pine infection was noted in both areas, resulting from the very favorable ribes to pine infection conditions which prevailed in 1941. A regular disease survey should be conducted on both areas in 1946 to properly appraise the percent of infection and the amount of damage that may be expected.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 19,114.34
	Regular BLR-3-4	41,556.85
	Subtotal	\$ 60,671.19
State of Idaho	State BLR-3-4	\$ 685.36
Potlatch Timber Protective Association	Private BLR-3-4	553.36
	Subtotal	\$ 1,238.72
Forest Service	Regular BLR-4	\$195,941.51
Total		\$257,851.42

TABLE 6

RIBES SPECIES ERADICATED, 1945
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes Species				Total Ribes
			Ribes leucostre	Ribes viscosissimum	Ribes petiolare	Ribes lanceum	
First	Cutover (1940-44)	43	709		16	3	728
	Reproduction (1910-39)	28	3	2,852	2		2,857
	All Types	71	712	2,852	18	3	3,585
Second	Reproduction (1910-39)	63	65	595			660
	All Types	63	65	595			660
	Plantation (1940-44)	242	12	12,467			12,479
Third	Cutover (1920-39)	145	1,181	130			1,311
	Reproduction (1910-39)	7,955	113,288	78,098	65	174	191,557
	Pole	338	3,089	1,007	2		4,098
	Stream	610	16,245	17	10,819	1,583	28,664
	All Types	9,290	133,747	91,719	10,886	1,757	238,109
	Cutover (1940-44)	43	709		16	3	728
All Workings	Plantation (1940-44)	242	12	12,467			12,479
	Cutover (1920-39)	145	1,181	130			1,311
	Reproduction (1910-39)	8,046	113,288	81,545	67	174	195,074
	Pole	338	3,089	1,007	2		4,098
	Stream	610	16,245	17	10,819	1,583	28,664
	All Types	9,484	134,524	95,166	10,904	1,760	242,354

TABLE 7

SUMMARY OF RIBES ERADICATION, 1929 - 1945
ST. JOE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Cutover	1940-44	308	221	14,730	.72	48	308	31,301
	Plantation	1940-44	2,209	4,763	1,092,843	2.16	495	2,209	
	Cutover	1920-39	16,291	11,381	3,596,739	.70	221	16,291	156,962
	Reproduction	1910-39	217,601	240,012	80,756,356	1.10	371	217,601	105,093
	Pole		86,838	33,082	7,780,055	.38	90	86,838	18,516
	Mature		177,162	68,756	17,998,538	.39	102	123,837	87,848
	Miscellaneous		2,652	2,297	767,429	.87	289	2,652	
	Stream (1)		35,469	97,121	23,358,708	2.74	659	35,469	
Second	Total		558,530	457,633	135,365,398	.85	251	485,205	399,720
	Plantation	1940-44	745	638	53,382	.86	72	745	
	Cutover	1920-39	7,046	7,502	524,246	1.06	74	7,046	
	Reproduction	1910-39	78,500	93,573	9,076,096	1.19	116	78,500	
	Pole		36,848	21,735	1,318,108	.59	36	36,848	
	Mature		8,965	6,831	821,719	.76	92	8,055	
	Miscellaneous		431	43	2,567	.10	6	431	
	Stream (2)		12,638	27,514	5,191,492	2.18	411	12,638	
Third	Total		145,173	157,836	16,987,610	1.09	117	144,263	
	Plantation	1940-44	242	300	12,479	1.24	52	242	
	Cutover	1920-39	205	290	2,088	1.41	10	205	
	Reproduction	1910-39	21,514	37,443	876,887	1.74	41	21,514	
	Pole		4,625	2,905	74,092	.63	16	4,625	
	Mature		170	325	38,042	1.91	224	170	
	Stream (3)		7,704	13,314	1,705,923	1.73	221	7,704	
	Total		34,480	54,577	2,709,511	1.58	79	34,480	
All Workings	Cutover	1940-44	308	221	14,730	.72	48	308	
	Plantation	1940-44	3,196	5,701	1,158,704	1.78	363	3,196	
	Cutover	1920-39	23,542	19,173	4,123,073	.81	175	23,542	
	Reproduction	1910-39	317,615	371,028	90,709,339	1.17	286	317,615	
	Pole		128,311	57,722	9,172,255	.45	71	128,311	
	Mature		186,297	75,912	18,858,299	.41	101	132,062	
	Miscellaneous		3,083	2,340	769,996	.76	250	3,083	
	Stream (4)		55,811	137,949	30,256,123	2.47	642	55,811	
All Workings	Total		718,163	870,046	155,062,519	.93	218	663,928	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	7,404	21,683	669,706
(2)	3,245	4,731	111,663
(3)	1,341	1,104	20,347
(4)	11,990	27,518	801,716

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929 - 1945
ST. JOE OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Ribes
Idaho	EQ-Coop.	37,544	32,759	4,659,669	60,114	.87	124
	EQ-Emerg.	234,519	157,898	43,593,387	77,088	.67	186
	FS-Reg.	182,877	208,906	34,586,054	314,332	1.14	189
	FS-Emerg.	70,981	45,138	15,333,106	101,476	.64	216
	CCC	192,242	225,345	56,890,303	248,706	1.17	286
	Total	718,163	670,046	155,062,519	801,716	.93	216

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929 - 1945
ST. JOE OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	215,404	76,979	19,961	312,344	96,804	312,208
	Public Domain	12,458	5,159	1,354	18,971	12,007	24,465
	Subtotal Federal	227,862	82,138	21,315	331,315	108,811	336,673
	State	57,898	19,213	3,553	80,664	57,171	115,069
	Private	199,445	42,912	9,592	251,949	233,738	433,183
	Subtotal Other	257,343	62,125	13,145	332,613	290,909	548,252
	Total	485,205	144,263	34,460	663,928	399,720	884,925

TABLE 10

RIBES SPECIES ERADICATED, 1929 - 1945
ST. JOE OPERATION

Working	Eradication Type	Gross Acres	Ribes Species						Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	Ribes irriguum	Ribes triste	
First	Cutover (1940-44)	308	11,017	3,694	16	3			14,730
	Plantation (1940-44)	2,209	158,749	933,486	161		447		1,092,843
	Cutover (1920-39)	16,291	1,132,425	2,452,653	8,329	2,120	1,212		3,596,739
	Reproduction (1910-39)	217,601	15,368,279	64,766,368	122,682	344,709	154,318		80,756,356
	Pole	86,838	3,234,919	4,383,484	21,170	53,499	76,983		7,780,055
	Mature	177,162	9,757,096	7,918,594	26,516	40,599	255,733		17,998,538
	Miscellaneous	2,652	148,445	615,565	1,987	1,432			767,429
	Stream	35,469	16,372,384	888,029	3,331,826	2,749,642	16,695	132	23,358,704
Second	All Types	538,530	46,183,314	81,961,873	3,512,687	3,202,004	505,368	132	135,365,398
	Plantation (1940-44)	745	8,165	45,217					53,382
	Cutover (1920-39)	7,046	285,707	227,775	1,765	2,781	6,218		524,246
	Reproduction (1910-39)	78,500	3,443,546	5,532,523	32,750	62,364	4,913		9,076,096
	Pole	36,848	572,299	721,515	5,807	18,483	4		1,318,108
	Mature	8,965	353,412	436,466		19	31,822		821,719
	Miscellaneous	431	456	2,111					2,567
	Stream	12,638	3,045,535	163,110	1,081,834	753,469	6,073	141,471	5,191,492
Third	All Types	145,173	7,709,120	7,128,717	1,122,156	837,116	49,030	141,471	16,987,610
	Plantation (1940-44)	242	12	12,467					12,479
	Cutover (1920-39)	205	1,847	241					2,088
	Reproduction (1910-39)	21,514	419,536	441,442	8,651	7,258			876,887
	Pole	4,625	52,714	21,190	44	144			74,092
	Mature	170	32,990	3,316	8		1,728		38,042
	Stream	7,704	809,515	23,061	498,873	372,092		2,382	1,705,923
	All Types	34,460	1,316,614	501,717	507,576	379,494	1,728	2,382	2,709,511
All Workings	Cutover (1940-44)	308	11,017	3,694	16	3			14,730
	Plantation (1940-44)	3,196	166,926	991,170	161		447		1,158,704
	Cutover (1920-39)	23,542	1,419,979	2,680,669	10,094	4,901	7,430		4,123,073
	Reproduction (1910-39)	317,615	19,231,361	70,740,333	164,083	414,331	159,231		90,709,339
	Pole	128,311	3,859,932	5,126,189	27,021	82,126	76,987		9,172,255
	Mature	186,297	10,143,498	8,358,376	26,524	40,618	289,283		18,858,299
	Miscellaneous	3,083	148,901	617,676	1,987	1,432			769,996
	Stream	55,811	20,227,434	1,074,200	4,912,533	3,878,203	22,768	143,985	30,256,124
All Workings	All Types	718,163	55,209,048	89,592,307	5,142,419	4,418,614	556,146	143,985	155,062,519

BLISTER RUST CONTROL WORK, COEUR D'ALENE OPERATION, 1945

By

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C. J. Pederson, Forester, U. S. Forest Service

INTRODUCTION

The 1945 blister rust control program on the Coeur d'Alene National Forest was initiated on April 27, when Mexican Nationals started working near the mouth of Steamboat Creek. On May 3, another group of Mexican Nationals commenced work on Lost Creek. During the spring program a maximum of 75 Mexican Nationals were used on blister rust control. This included pruning work near the mouth of Steamboat Creek and the early season burning of 60 acres of brush area on Scott Creek. The first student camp was occupied on May 22. The last Mexican Nationals left on September 21. During the approximate period of May 20 to July 12 there were no Mexicans engaged on blister rust control work on the forest. Nine camp locations were occupied, eight on roads and one pack camp, and all work was financed by regular Forest Service appropriations. The following summary shows accomplishments on blister rust field work performed by the different classes of labor:

Labor	Number Workers	Ribes Eradication <u>Acres</u> <u>Man-Days</u>	Canker Elimination Ribes Trees Treated	Man-Days
Student	165	2,796 4,745	163,387	
Mexican National	225	2,306 4,996	217,971	54,997 248

Total acreage worked consisted of 1,208 acres of first working, 1,937 of second and 1,957 of third working.

A number of factors contributed toward making the past season disappointing. As in the last few years, there was not sufficient experienced overhead for all camps. Four of the camp foremen were inexperienced in that capacity and it was not possible to secure sufficient experienced assistance for them. Comparatively few experienced workers returned. The Mexican program was not as productive as had been anticipated because of a late spring and unusually inclement weather at the beginning of the season, the poor quality of the workers and a lack of sufficient experienced overhead. Mexican Nationals were not capable of adjusting themselves to changes in working conditions or methods and constituted a continuous administrative problem. As was the case in 1944, fire fighting interfered materially with the orderly progress of the work. A total of 4,838 man-days was spent by blister rust crews in fighting fires. Some camps were just reaching their productive peak when called on fire and were never able to reach maximum production afterward. In one camp 43 workers left in a group upon returning from 20 days spent on fire. However, satisfactory accomplishments were attained in the camps where it was possible to have competent overhead and where there was comparatively little interruption because of fire.

The Forest Service was responsible for the administration and maintenance of the camps and technical supervision was provided by the Bureau of Entomology and Plant Quarantine.

LOCATION AND DESCRIPTION OF AREAS

Ribes eradication efforts were confined to the protection of plantations and natural reproduction areas with the exception of a pole stand on Burnt Cabin Creek where one more fast working was needed to place the area on a maintenance basis.

1. Steamboat. Area located in secs. 23 and 24, T. 50 N., R. 2 E. This camp was occupied by Mexican Nationals on April 3. Blister rust control work was started on April 27 and continued until the camp closed on May 26. Ribes eradication consisted of first working in a mixed pole and reproduction stand near the mouths of Scott and Steamboat Creeks. Infection is very heavy here as is evidenced by the fact that on 26 acres where pruning work was done there were 7,402 trees removed out of 7,854 trees treated. Not only were a majority of the ribes removed but the pruning job saved many trees on the area and materially reduced the production of spores which would menace the pole stand on the opposite side of the Coeur d'Alene River. As an experiment a 60-acre area of heavy brush and ribes was burned on May 7 after a fire line had been constructed by means of a bulldozer. While a good flash burn was secured it is probable that the soil was so wet that stored seed was not destroyed and that the large Ribes viscosissimum were only burned off at the top of the ground.

2. Lost Creek. The area is located in secs. 9 and 10, T. 50 N., R. 4 E. Ribes eradication work was done by Mexican Nationals from the Shoshone Creek camp in the reproduction stand at the mouth of Lost Creek starting on May 3 and closing on May 26. Second and third working was performed but because not all ribes were in leaf and the terrain was too steep for the type of labor used the work was not entirely satisfactory.

3. Lone Cabin. This area is located in secs. 23, 24, 25 and 26, T. 51 N., R. 2 W., and secs. 28 and 33, T. 51 N., R. 1 W. The camp was established on June 4 and closed September 21 and was occupied by student labor until August 14 after which time the crew was composed of Mexican Nationals. Second and third working was performed in natural reproduction stands on Lone Cabin and Sands Creeks. Because of interruptions for fire fighting and the loss of most of the original crew upon returning from fire the work planned was not completed. This should be the first priority area for 1946. Infection is heavy in Lone Cabin but it is felt that with a good ribes eradication job, augmented by pruning of infected trees and the removal of those with trunk cankers, sufficient trees can be saved to insure a satisfactory stand of white pine.

As many men as could be equipped started pruning work on August 21 and continued as long as weather permitted. This resulted in the pruning of 47,143 trees of which 10,787 were infected.

4. Bottom Creek. The area is located in secs. 13, 14, 15, 22, 23 and 24, T. 51 N., R. 2 W. Camp was established on July 12 and closed on September 21 and was manned entirely by Mexican Nationals. Ribes eradication consisted of third working in natural reproduction following logging, pole and a small

amount of mature type in the protection zone. The assigned area was not completed since this crew was used on fire fighting more than any other blister rust crew. On a calendar day basis this crew spent only 55 percent of the total available time on blister rust work. The work area connected with that worked in 1944 and continued up Burnt Cabin Creek. The pole stand is now considered on a maintenance basis but some additional work will be necessary in portions of the reproduction stand. Pine infection is present in the younger age class and the work in this drainage should be continued in 1946.

5. Hudlow. This crew worked in secs. 19, 30 and 31, T. 52 N., R. 1 W., secs. 35 and 36, T. 52 N., R. 2 W., and secs. 1 and 2, T. 51 N., R. 2 W. Blister rust work was started on June 13 and closed on September 21. The original blister rust crew consisted of student labor and on July 23 Mexican Nationals were also located there.

Ribes eradication work was performed in the white pine plantation on Nicholas Creek, stream type on Hudlow Creek and plantation and natural reproduction on East Fork Hudlow. The plantation area on Nicholas Creek was completed although additional work is needed in the protection zone on the west side. Additional work is also needed on Hudlow Creek and on the East Fork of Hudlow where time did not permit the necessary mop-up. Infection conditions are not serious in any of the areas worked by this crew.

6. Trail Creek. The worked area is located in secs. 15 and 22, T. 52 N., R. 1 E., and consisted primarily of stream type along Trail Creek above the mouth of Hamilton Creek. Mexican Nationals occupied this camp on July 16 and the camp was closed on August 13 when the crew was moved to Lone Cabin and Nowhere camps in order to use the men on areas of higher priority. While this camp was occupied, 56 percent of the available time was spent in fire fighting.

7. Bear Creek. Work was performed in secs. 13 and 24, T. 52 N., R. 1 E., and the camp was occupied on July 21 and closed on August 30 when the crew was moved to higher priority areas which were in more urgent need of work. Ribes eradication consisted entirely of first working in stream type and was performed by Mexican Nationals. An attempt to use an entire Mexican crew here, including overhead and cooks, was not very satisfactory. While there is not much infection in this area the natural white pine reproduction should be given first working soon.

8. Owl Creek. Worked area is located in secs. 30 and 31, T. 53 N., R. 2 E., sec. 36, T. 53 N., R. 1 E., sec. 1, T. 52 N., R. 1 E., sec. 6 T. 52 N., R. 2 E. The camp was established on July 17 and closed on September 21. It was the only pack camp on the operation. Ribes eradication consisted of third working in plantation and was an extension of area worked in 1944. The camp was manned by Mexican Nationals and was the only crew which was not called upon to fight fire. Because of good supervision, this crew came nearer meeting expectations than any of the other Mexican National crews. A very large percentage of the area worked can be placed on a maintenance basis.

9. Nowhere. Area worked this season is located in secs. 7, 8, 17, 18, 19 and 20, T. 52 N., R. 3 E., and secs. 13, 23 and 24, T. 52 N., R. 2 E. The camp was first occupied by student labor on May 22 and closed on September 14. Mexican Nationals were added to the crew from other camps to insure completing the assigned area. First, second and third workings were done to complete work started in 1944 on the Senator Creek plantation area, on the Brett Creek area which was planted in the spring of 1945 and the natural reproduction area along the river adjacent to the plantings. Very satisfactory work was performed by the student labor in this camp, resulting in a goodly portion of the plantation areas being placed on maintenance. This was the only camp which reached its acreage quota, due principally to the fact that only 150 man-days were spent on fire.

Generally speaking, the plantation areas worked from Nowhere, Owl and Hudlow camps and the pole stand along Burnt Cabin Creek represented fairly good working conditions. Stream type on Bear Creek and along the Coeur d'Alene River was rather severe. Reproduction stands on Lone Cabin and Burnt Cabin Creeks represented difficult working conditions because of the many small ribes present and poor visibility conditions.

All areas worked in 1945 are in Federal ownership.

WORKING METHODS

The use of Mexican Nationals necessitated many variations of working methods ranging from the gang formation to individual 3-man crews in adjoining lanes. Working methods used depended upon the number of assistant foremen and straw bosses available. Mexican crews could not work in very wide strips regardless of working conditions. Because of the type of labor, plus interruptions for fire fighting, it was necessary to carry on a continuous training program. With student labor it was possible in some cases to use individual 3-man crews. All workers were given training in the proper use of common woods tools before any ribes eradication work was undertaken. All string lines were laid in advance by specially trained crews. The practice of the camp foreman interviewing each worker immediately upon his arrival in camp continued with the student labor.

CHECKING AND SURVEYS

A checker foreman and one experienced checker were available at the start of the season but others, some of whom had previous blister rust experience, were trained for the work and at one time there were eight checkers employed although only four remained throughout the ribes eradication season.

Regular check was performed on practically all of the area worked this season. The only exceptions were areas where it was evident from the large number of ribes removed that additional working would be necessary; areas worked late in the season when a satisfactory check could not be obtained, and a few areas where needed mop-up was not accomplished. Regular check shows that satisfactory work was accomplished on plantation areas and in pole and mature stands. Some of the natural reproduction areas will need further work due to difficult working conditions and small bushes occurring where visibility is very poor.

Advance survey was conducted on Bear Creek and the prepared maps will be of assistance in planning the work on this area at some future time.

Only a small amount of disease survey was conducted during the season because all checkers were needed for regular check. When other qualified men became available the lateness of the season necessitated confining efforts to highest priority areas on the North Fork of the Coeur d'Alene River where blister rust infection is probably more severe than on any other area of comparable size on the forest. Areas were selected which would give the best general picture of infection conditions. Because of a lack of time, the work was speeded up by running strips ten chains apart and by taking data on strips one-half rod wide. It was felt that this would give a sufficiently accurate picture and more area could be sampled. The results of this survey are summarized as follows:

Area	Miles Strip	Trees Examined	Trees Infected	Percent Infection
Honey Creek Burn, secs. 31, 32, T. 53 N., R. 1 W., sec. 36, T. 53 N., R. 2 W., secs. 5, 6, T. 52 N., R. 1 W.	2.5	1,124	16	1.4
Frog Creek, secs. 5, 6, 8, T. 52 N., R. 1 W.	1.8	971	73	7.5
Tom Lavin, secs. 7, 12, 17, 18, T. 52 N., R. 1 W.	3.1	1,877	133	7.1
Solitaire Burns, secs. 9, 16, 17, T. 52 N., R. 1 W.	3.2	1,529	143	9.3
Lewelling Creek, secs. 18, 19, 20, T. 52 N., R. 1 W.	2.0	978	157	14.0
Squirrel Creek, secs. 19, 20, T. 52 N., R. 1 W.	.4	119	20	16.8
Iron Creek, secs. 21, 22, 27, 28, T. 52 N., R. 1 W.	4.9	1,135	116	10.2
Middle Fork Hudlow, sec. 24, T. 52 N., R. 2 W.	.8	420	29	6.9
Bottom Creek, secs. 11, 12, 13, 14, T. 51 N., R. 2 W.	2.3	2,274	140	6.2
Lone Cabin, secs. 19, 30, T. 51 N., R. 1 W.	3.7	1,898	258	13.6

These areas are either plantations or very good stands of natural reproduction. The Honey Creek Burn was worked last in 1944 and from the amount of infection present is apparently in a safe condition for a number of years. Frog Creek, Tom Lavin and Lewelling were worked last in 1942 or prior thereto, and those portions containing ribes should be worked during the next season to prevent a build-up of infection. Squirrel Creek was used as a training area this season and mop-up work should be done there in 1946. The data for Iron Creek represent samples of plantings on Moose Creek, Cataract and Rablens Fork. These areas have not been worked since planting and need immediate attention. The Middle Fork Hudlow area supports a mixture of plantation and natural reproduction and work was performed here in 1945 but no infection data were available. The Bottom Creek area is natural reproduction following logging and extends from the mouth to the dense pole stand. The portion of Lone Cabin surveyed is downstream from this year's work and extends to Burnt Cabin Creek. Both of these areas should be worked in 1946.

Very little time was spent in continuing the area classification work started in 1943 because of the late closing of the eradication season and a lack of qualified personnel. However, some work was done in the vicinity of Deer Creek and Beaver Lookout, the East Fork in the vicinity of Larch Mountain, Beaver Creek near Prichard and in Hayden, Mokins, Yellowbanks, Phantom and Stella Creeks. Uranus Creek was also examined and it was decided to place that portion from which white pine had been removed on a deferred basis.

CONTROL STATUS

Since the area classification work is not completed and because the post check program is very much behind schedule, any control status figures which would apply to the entire operation are subject to continual change. Ribes eradication work performed during the 1945 field season resulted in approximately 3,692 acres of that work being classed as on a maintenance basis, 282 acres needing post check and 1,128 acres needing rework. No appreciable amount of post check survey was conducted.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945
COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 3,243.57
Forest Service	Regular BLR-4	200,854.15
Total		\$204,097.72

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
COEUR D'ALENE OPERATION

Item	Bureau of Entomology and Plant Quarantine	Forest Service	Total
	Regular BLR-1-4	Regular BLR-4	
Sal. perm. men	\$3,088.01	\$ 5,098.65	\$ 8,186.66
Sal. temp. men		9,461.12	9,461.12
Wages, temp. labs.		135,792.62	135,792.62
Subs. supplies		36,785.29	36,785.29
Equipment		2,757.22	2,757.22
Travel and transp.	152.12	3,010.42	3,162.54
Other supplies	3.44	7,948.82	7,952.26
Total	\$3,243.57	\$ 200,854.15	\$204,097.72

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Plantation	1945-49	715	403	9,547	.56	13
	Plantation	1940-44	205	260	34,187	1.27	167
	Reproduction	1910-39	207	505	21,714	2.44	105
	Miscellaneous		21	40	4,667	1.90	222
	Stream		60	481	45,326	8.02	755
	Total		1,208	1,689	115,441	1.40	96
Second	Plantation	1940-44	255	753	28,382	2.95	111
	Cutover	1920-39	152	531	22,901	3.49	151
	Reproduction	1910-39	1,000	2,043	83,011	2.04	83
	Mature		155	483	14,968	3.12	97
	Miscellaneous		203	203	4,587	1.00	23
	Stream		172	638	22,253	3.71	29
Third	Total		1,937	4,651	176,102	2.40	91
	Cutover	1920-39	326	1,172	30,370	3.60	93
	Reproduction	1910-39	1,102	1,409	42,932	1.28	39
	Pole		267	182	1,532	.68	6
	Mature		169	164	4,162	.97	25
	Stream		93	474	10,819	5.10	116
All Workings	Total		1,957	3,401	89,815	1.74	46
	Plantation	1945-49	715	403	9,547	.56	13
	Plantation	1940-44	460	1,013	62,569	2.20	136
	Cutover	1920-39	478	1,703	53,271	3.56	111
	Reproduction	1910-39	2,309	3,957	147,657	1.71	64
	Pole		267	182	1,532	.68	6
All Workings	Mature		324	647	19,130	2.00	59
	Miscellaneous		224	243	9,254	1.08	41
	Stream		325	1,593	78,398	4.90	241
	Total		5,102	9,741	381,358	1.91	75

TABLE 4

RIBES SPECIES ERADICATED, 1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes Species				Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	
First	Plantation (1945-49)	715	6,130	3,398		19	9,547
	Plantation (1940-44)	205	6,221	27,966			34,187
	Reproduction (1910-39)	207	2,887	18,827			21,714
	Miscellaneous	21	456	4,211			4,667
	Stream	60	19,831	12	25,483		45,326
	All Types	1,208	35,525	54,414	25,483	19	115,441
Second	Plantation (1940-44)	255	28,281	101			28,382
	Cutover (1920-39)	152	21,381	1,520			22,901
	Reproduction (1910-39)	1,000	68,744	13,373		894	83,011
	Mature	155	12,825	2,143			14,968
	Miscellaneous	203	1,925	2,662			4,587
	Stream	172	20,939	1,314			22,253
Third	All Types	1,937	154,095	21,113		894	176,102
	Cutover (1920-39)	326	29,783	587			30,370
	Reproduction (1910-39)	1,102	35,812	5,921		1,199	42,932
	Pole	267	1,532				1,532
	Mature	169	3,326	836			4,162
	Stream	93	10,808	11			10,819
All Workings	All Types	1,957	81,261	7,355		1,199	89,815
	Plantation (1945-49)	715	6,130	3,398		19	9,547
	Plantation (1940-44)	460	34,502	28,067			62,569
	Cutover (1920-39)	478	51,164	2,107			53,271
	Reproduction (1910-39)	2,309	107,443	38,121		2,093	147,657
	Pole	267	1,532				1,532
All Workings	Mature	324	16,151	2,979			19,130
	Miscellaneous	224	2,381	6,873			9,254
	Stream	325	51,878	1,337	25,483		78,398
	All Types	5,102	270,681	82,882	25,483	2,112	381,358

TABLE 5

SUMMARY OF RIBES ERADICATION, 1927 - 1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-49	715	403	9,547	.56	13	715	
	Cutover	1940-44							9,568*
	Burn	1940-44	716	351	53,652	.49	75	716	246
	Plantation	1940-44	992	1,920	465,201	1.94	469	992	227
	Cutover	1920-39	16,231	21,084	5,314,713	1.30	327	16,231	19,378
	Reproduction	1910-39	89,696	139,112	20,700,143	1.55	231	87,873	10,813
	Pole		65,866	31,254	4,479,922	.47	68	65,130	9,565
	Mature		141,096	87,729	13,798,358	.62	98	123,079	7,390
	Miscellaneous		13,333	16,695	2,965,945	1.25	222	12,909	304
	Stream		14,868	57,706	11,815,944	3.88	795	14,760	2,655
Second	Total		343,513	356,254	59,503,425	1.04	174	322,405	60,145
	Plantation	1940-44	618	1,529	130,960	2.47	212	618	
	Cutover	1920-39	8,938	12,768	1,924,931	1.43	215	8,938	
	Reproduction	1910-39	17,287	28,904	1,824,636	1.67	106	16,554	
	Pole		4,816	3,093	485,788	.64	101	4,816	
	Mature		10,118	8,071	810,766	.80	80	9,818	
	Miscellaneous		1,585	2,963	358,052	1.87	226	1,585	
	Stream		7,787	14,193	1,560,951	1.82	200	7,679	
	Total		51,149	71,521	7,096,284	1.40	139	50,008	
	Plantation	1940-44	513	919	51,175	1.79	100	513	
Third	Cutover	1920-39	3,246	6,064	293,587	1.87	90	3,246	
	Reproduction	1910-39	3,523	5,892	231,989	1.67	66	2,916	
	Pole		749	679	52,144	.91	70	749	
	Mature		1,713	1,236	70,610	.72	41	1,713	
	Miscellaneous		13	11	1,424	.85	110	13	
	Stream		1,465	2,614	131,981	1.78	90	1,465	
	Total		11,222	17,415	832,910	1.55	74	10,615	
	Plantation	1945-49	715	403	9,547	.56	13	715	
	Burn	1940-44	716	351	53,652	.49	75	716	
	Plantation	1940-44	2,123	4,368	647,336	2.06	305	2,123	
All Workings	Cutover	1920-39	28,415	39,916	7,533,231	1.40	265	28,415	
	Reproduction	1910-39	110,506	173,908	22,756,968	1.57	206	107,343	
	Pole		71,431	35,026	5,017,854	.49	70	70,695	
	Mature		152,927	97,036	14,679,734	.63	96	134,610	
	Miscellaneous		14,931	19,669	3,325,421	1.32	223	14,507	
	Stream		24,120	74,513	13,508,876	3.09	560	23,904	
	Total		405,884	445,190	67,532,619	1.10	166	385,028	

*Includes 1,920 acres cut over in 1945

TABLE 6

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1945
COEUR D'ALENE OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Per Acre	
					Man-Days	Ribes
Idaho	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	EQ-Emerg.	41,039	35,541	6,589,217	.87	161
	FS-Reg.	79,087	94,399	14,331,387	1.19	181
	FS-Emerg.	111,711	86,897	17,620,173	.78	158
	CCC	148,271	220,002	26,145,459	1.48	176
	Total	405,884	445,190	67,532,619	1.10	166

TABLE 7

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1945
COEUR D'ALENE OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	306,261	47,764	10,486	364,511	53,195	359,456
	State	5,497	440	45	5,912	711	6,138
	Private	10,717	1,804	84	12,605	6,240	16,957
	Subtotal Other	16,144	2,244	129	18,517	6,951	23,095
	Total	322,405	50,008	10,615	383,028	60,146	382,551

TABLE 8

RIBES SPECIES ERADICATED, 1927-1945
COEUR D'ALENE OPERATION

Working	Eradication Type	Gross Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Plantation (1945-49)	715	6,130	3,398			19	9,547
	Burn (1940-44)	716	47,019	6,633				53,652
	Plantation (1940-44)	992	331,135	134,066				465,201
	Cutover (1920-39)	16,231	3,806,948	1,462,643	1	17,536	27,585	5,314,713
	Reproduction (1910-39)	89,696	12,167,831	7,900,866	2,227	526,767	102,452	20,700,143
	Pole	65,866	2,612,374	1,799,139	12,246	12,823	43,340	4,479,922
	Mature	141,096	10,712,514	2,845,919	1	89,402	150,522	13,798,358
	Miscellaneous	13,333	1,294,530	1,630,684		31,121	9,610	2,965,945
	Stream	14,868	7,271,186	183,273	31,474	4,261,624	68,387	11,815,944
	All Types	343,513	38,249,667	15,966,821	45,949	4,939,273	401,915	59,603,485
Second	Plantation (1940-44)	618	114,950	16,010				130,960
	Cutover (1920-39)	8,938	1,582,771	325,474		13,606	3,080	1,924,931
	Reproduction (1910-39)	17,287	1,003,936	797,942		13,229	9,729	1,824,836
	Pole	4,816	364,939	111,666	4,736	3,882	565	485,788
	Mature	10,118	524,226	271,114		11,089	4,337	810,766
	Miscellaneous	1,585	165,803	192,249				358,052
	Stream	7,787	1,089,378	45,072		420,500	6,001	1,560,951
	All Types	51,149	4,846,003	1,759,527	4,736	462,306	23,712	7,096,284
Third	Plantation (1940-44)	513	46,607	4,568				51,175
	Cutover (1920-39)	3,246	255,559	38,028				293,587
	Reproduction (1910-39)	3,523	153,994	75,131		1,648	1,216	231,989
	Pole	749	41,954	10,190				52,144
	Mature	1,713	67,497	3,113				70,610
	Miscellaneous	13	129	1,295				1,424
	Stream	1,465	93,982	213		37,778	8	131,981
	All Types	11,222	659,722	132,538		39,426	1,224	832,910
All Workings	Plantation (1945-49)	715	6,130	3,398			19	9,547
	Burn (1940-44)	716	47,019	6,633				53,652
	Plantation (1940-44)	2,123	492,692	154,644				647,336
	Cutover (1920-39)	28,415	5,645,278	1,826,145	1	31,142	30,665	7,533,231
	Reproduction (1910-39)	110,506	13,325,761	8,773,939	2,227	541,644	113,397	22,756,968
	Pole	71,431	3,019,267	1,920,995	16,982	16,705	43,905	5,017,854
	Mature	152,927	11,304,237	3,120,146	1	100,491	154,859	14,679,734
	Miscellaneous	14,931	1,460,462	1,824,228		31,121	9,610	3,325,421
	Stream	24,120	8,454,546	228,558	31,474	4,719,902	74,396	13,508,876
	All Types	405,884	49,755,392	17,858,686	50,686	5,441,005	426,851	67,532,619

BLISTER RUST CONTROL WORK, KANIKSU OPERATION, 1945

By

H. A. Brischle, Operation Supervisor

L. J. Easley, Assistant Operation Supervisor

G. M. Houghton, Checker Foreman, Forest Service

Within the boundaries of the Kaniksu blister rust control project are the valuable white pine areas administered by the Kaniksu National Forest, the Priest Lake Timber Protective Association as well as areas of state and private ownership. These areas are located in Bonner and Boundary Counties in Northern Idaho and Pend Oreille County in Northeastern Washington.

The 1945 work program consisted of four camps financed from Forest Service regular funds varying in size from 30 to 45 boys, 3 internee camps from 35 to 65 men each. A camp of Mexican Nationals was used in the early spring and again in late summer. There were also two Bureau cooperative camps of 45 boys each located on State of Idaho lands and financed by state and private funds and federal funds made available under the Lea Act.

As in the past several seasons the teen-age crews were made up of boys 16 to 18 years of age. Mexican Nationals were secured through the War Food Administration. They were used during the early spring until the latter part of May at which time they were released for farm work. They were secured again about the middle of July and kept until September 30. The German Internees were secured through the Immigration and Naturalization Service of the Department of Justice. They arrived on the project early in May and were kept until August 16, 1945, at which time they were returned to the internment camp for repatriation or release.

As in the past it was difficult to obtain enough qualified and experienced overhead to adequately supervise all the crews. However, there was a larger nucleus of experienced workers than in 1944. This factor, together with experience gained in training and supervising teen-age workers the past several years, resulted in considerable improvement in the quality and quantity of work as well as a reduction in turnover.

Heavy late snow and a late spring greatly hampered early field work. The first ribes eradication was done with Mexican crews on May 3. The first German camp was established near Lone, Washington on May 7. The first crew of boys arrived on May 22. Good weather conditions prevailed after May 20 and throughout the remainder of the season very little time was lost due to rain. The blister rust season was somewhat shortened for the boys in the Forest Service camps by the occurrence of several fires about the middle of August. Many boys failed to return to their respective camps for blister rust work after being released from these fires. A total of 618 man-days were spent on fire suppression by the boy crews, 709 man-days by the German Internees and 573 man-days by the Mexicans.

A group of 45 Mexicans worked on ribes eradication throughout the month of September. All other camps were closed by September 1. During the season a

total of 20,095 acres were worked by all camps including 5,363 acres of initial and 14,732 acres of second and third working. The following accomplishments were made by the different classes of labor:

Labor	Number Workers	<u>Ribes Eradication</u>			<u>Canker Elimination</u>	
		Acres	Man-Days	Ribes	Trees Treated	Man-Days
Student	238	10,559	9,146	905,452		
Mexican National	66	2,238	2,616	314,773	55,000	338
German Internees	153	7,298	4,817	854,218		
Total	457	20,095	16,579	2,074,443	55,000	338

Most of the work was done on the younger stands which are increasing rapidly as a result of heavy cutting of mature stands. The year 1945 did not appear to be a favorable one for the spread of the rust. Disease surveys made during the year indicate that only a small amount of new infection has occurred since the last serious spread in 1941.

ORGANIZATION AND ADMINISTRATION

Blister rust headquarters on Kalispell Bay served as the operation headquarters for both Forest Service and Bureau camps. The clerical work necessary for the ordering and handling of supplies, equipment, preparation of pay rolls, property records, etc., was under the supervision of Harry S. Peters who was assisted with the warehousing by one Forest Service employee and one German internee. Deliveries were made to nine camps by truck. One isolated camp was serviced by pack stock and one by boat. The organization was as follows:

H. A. Brischle, Operation Supervisor

L. J. Easley, Assistant Operation Supervisor

G. M. Houghton, In Charge of Checking

H. S. Peters, Assistant to Operation Supervisor in Charge

Operation Headquarters

The above officers supervised and administered both the Forest Service and Bureau of Entomology and Plant Quarantine Camps.

Program	Number Camps	Number Workers	Number Checkers
FS-Regular	4	144	3
FS-Regular Internee	3	151	2
FS-Regular Mexican	1	66	1
EQ-Cooperative	2	88	2
Total men employed at peak of season - 457 (July 15)			

DESCRIPTION OF AREAS AND LOCATION OF WORK

Bureau Cooperative Camps

Camp 401	Township	Range	Sections in Which Work was Performed
Big Creek	57N	3W	6, 7, 8, 9, 17, 18
	57N	4W	12, 13

This camp was opened on June 1 and closed August 25. A total of 2,262 acres were worked. On 72 acres of first working 264 ribes per acre were removed, 72 acres of second working had 213 ribes per acre, and 2,118 acres of third working had 56 ribes per acre. The entire area was worked at the rate of .84 man-days per acre. The check indicates that on the portions of the area that have been worked three times, the ribes have been reduced to 3 bushes and 5 feet of live stem per acre. Logging operations were completed on this area in 1934. Numerous suppressed ribes, missed on previous workings, have been a difficult problem. In favorable growing seasons these bushes, after retaining seedling size for several years, put on appreciable growth. It is planned to post check the area in two or three years to determine the control status.

Camp 402	Township	Range	Sections in Which Work was Performed
Caribou Creek	62N	4W	3
	63N	4W	25, 26, 27, 34, 35, 36

This camp was opened on June 1 and closed on August 25. A total of 1,664 acres were worked all of which were second work. The area is in a 1926 burn and the white pine going from the reproduction to the pole stage. Twenty-one ribes per acre were removed at the rate of .96 man-days per acre. The final check shows 3 ribes with 3 feet of live stem per acre remaining.

The ribes on this area appear to be well stabilized. It is planned to post check the area in two or three years to determine the effectiveness of control.

Forest Service Camps (Regular)

Camp 400	Township	Range	Sections in Which Work was Performed
Kalispell Bay	35N	45E	13
	35N	46E	18
	36N	45E	34, 35
	59N	4W	6
	59N	5W	4, 5, 10, 11, 12, 13
	60N	4W	21
	60N	5W	2, 9, 22, 26, 27, 29, 30, 32

This camp was opened on June 4, and was closed on August 25. From a work standpoint the camp was non-effective after August 18, when the boys were engaged in fire suppression through the remainder of August.

This crew operated out of Kalispell Bay headquarters, being hauled to work by trucks. The work was done on widely separated areas within a 15-mile radius from camp. By operating this project in conjunction with blister rust headquarters it eliminated the establishment of a separate camp and materially cut down the expense of maintaining headquarter facilities. The areas worked by the crews were stream type in the Binarch Creek pole stands, cut-over areas in Lamb Creek, Lamb Creek stream type and a portion of the Lamb Creek plantation.

A total of 1,432 acres were worked of which 636 were first, 762 second and 34 acres were third work. On first working 155 ribes were removed per acre, 41 per acre on second and 33 on third working. Ninety ribes per acre were removed at the rate of .89 man-days per acre.

Camp 451	Township	Range	Sections in Which Work was Performed
Boswell	33N	45E	1, 2, 12, 13
	33N	46E	6, 18
	34N	45E	27, 28, 33, 34, 35
	57N	5W	5, 6

This camp was made up of German Internees, which were carried over from a winter snagging and hazard reduction project. The camp started ribes eradication work on May 15. They spent 312 man-days on fire suppression. The camp was closed on August 16 when they were returned to the internment camp.

This camp worked 1,491 acres in recent cut-over and the 1938 Goose Creek Burn. Two hundred and sixty-four ribes per acre were removed at the rate of 1.17 man-days per acre.

During the winter of 1944-45, this camp snagged that portion of the Goose Creek Burn above the road, an area of 225 acres. On September 12 the area was control burned. A good clean burn resulted destroying many large ribes and leaving the area in good shape for planting.

Camp 452	Township	Range	Sections in Which Work was Performed
Diamond Creek	36N	45E	1, 2, 11, 12
	36N	46E	6, 7

This camp was started with German Internees May 20. By July a number of the internees had been paroled leaving too small a group for efficient operation. Accordingly they were redistributed among the other internee camps and the camp was filled with boys. The combined crews worked 801 acres and pulled 708 ribes per acre; 644 acres were first work and 157 acres second work. The area was covered at the rate of 1.39 man-days per acre. Most of the area was originally burned in 1926. The area came back to heavy ribes and was heavily infected by 1940 at which time it was snagged by a CCC crew. It was control burned in 1942. A hard clean burn was obtained over most of the area. A part of the area was planted in 1944.

Numerous seedlings have come back, many of which failed to survive. The surviving ribes have been fairly easy to eradicate since they are readily

accessible due to the clean burn. Some additional work adjacent to the burn area will be necessary in 1946 to adequately protect the planted area.

<u>Camp 453</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work was Performed</u>
F-164 (4-Cors.)	32N	45E	7, 18
	57N	5W	9, 13, 16
	58N	5W	25, 33, 34, 36

A 25-man crew of Mexicans started canker elimination on the Cuban Hill Plantation area on April 16. This work was carried on until May. Fifty-five thousand trees were treated on 110 acres in 238 man-days. The first Mexican crew started ribes eradication on May 3. The crew was built up to 90 Mexicans who remained on ribes eradication work until May 31. A total of 1,314 acres were worked, 340 of which were first work and 974 second work. The area was worked at the rate of .39 man-days per acre, 80 ribes per acre were removed. No checkers were available at the time of working. A later check revealed several spots that need reworking.

<u>Camp 454</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Squaw Valley	35N	45E	10, 11, 13, 14, 15, 24

This camp was made up of 50 German Internees. The entire group was used on a planting project during the latter part of May and until June 24. Ribes eradication work was done until August 15; 1,630 acres of first and second work were done at the rate of .74 man-days per acre, 67 ribes per acre were removed. Most of the work was done in 1935-36 cut-over. An advance survey was made on 4 sections of 1939 burn to determine feasibility of incorporating this area into the control area. This camp was on fire suppression 270 man-days. The camp closed down on the 16th of August.

<u>Camp 455</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work Was Performed</u>
Kalispell Creek	36N	45E	9, 10, 15, 16, 21, 22, 27, 28, 29, 33, 34

This camp was opened on May 22 when the first contingent of boys arrived on the job. The camp was operated as a boys camp until July 10 when the boys were replaced by 66 Mexicans. The boys were moved into the Diamond Creek camp (#452).

The boys worked 1,848 acres and removed 53 ribes per acre at the rate of .78 man-days per acre. The Mexicans worked 925 acres, removed 229 ribes per acre at the rate of 1.55 man-days per acre. The Mexicans were used on an area of heavy ribes concentration that was worked in order to increase the protection zone for a planted area.

<u>Camp 456</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work was Performed</u>
Zero Creek	37N	45E	1
	62N	5W	5, 6, 7, 8, 17, 18

The boy crew for this camp arrived on June 4. A total of 858 acres were worked, 48 acres of which were first, 270 acres second, and 540 third. The area was worked at the rate of 1.63 man-days and 335 ribes per acre for first work, 1.93 man-days and 73 ribes per acre for second work, 1.46 man-days and 68 ribes per acre for third work. The work was on the Zero Creek plantation and adjacent protection zone. To date the ribes have been very persistent. However, it appears that the area is now becoming rapidly stabilized. The plantation is on a 1926 reburn of an 1896 burn. Portions of the area around the plantation have come back to very heavy brush thus making a thorough eradication job difficult as evidenced by the man-day per acre figures. It is planned to relocate a camp in this drainage next season to complete the work of an adequate protection zone for the plantation.

<u>Camp 457</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work was Performed</u>
Lamb Creek	35N	45E	1, 2
	36N	45E	25, 26, 33, 34, 35, 36

The boy crew arrived in this camp on June 15. A total of 1,980 acres were worked at the rate of .37 man-days per acre and 38 ribes per acre were removed. Of the total acres worked there were 168 acres of first work on which an average of 183 ribes per acre were removed with the average man-day per acre rate of .73. On second work 414 acres were worked on which 31 ribes per acre were removed at the rate of .56 man-days per acre. On third work 1,398 acres were worked on which 22 ribes per acre were removed at the rate of .27 man-days per acre.

The work on this area was in and adjacent to the 1941 white pine plantation. The protection zone around this area was enlarged. Additional work is planned on this area next season.

<u>Camp 458</u>	<u>Township</u>	<u>Range</u>	<u>Sections in Which Work was Performed</u>
Tiger Hill	37N	42E	11, 13, 14, 23, 24, 25, 26, 27, 33, 34

This camp opened May 7 and was composed of 35 German Internees. The camp closed August 16 when the Germans were sent back to Fort Lincoln for reclassification.

A total of 3,890 acres were worked at the rate of .41 man-days per acre. An average of 42 ribes were removed per acre.

Of the total acres worked there were 770 acres of first work on which an average of 155 ribes per acre were removed at the rate of .50 man-days per acre.

There were 3,120 acres of second work on which an average of 14 ribes per acre were removed at the rate of .39 man-days per acre. Most of the work on this area was done on and adjacent to the Tiger Hill 1940 white pine plantation. Eradication work was done on 1,100 acres of pole.

CHECKING AND PINE DISEASE SURVEY

The checking force was composed of four regular Forest Service checkers, two Bureau and two German Internees. With the exception of the two internees, the checkers were high school students. All of the checkers had previous experience in blister rust control work and they were picked for this work for their ability to find ribes. One student and one internee had checking experience during the 1944 season.

All but 460 of the 20,095 acres worked were inspected by a four percent check, at a cost of \$0.161 per acre. The current season's eradication constituted the majority of the checking work. Four sections of advance check were run adjacent to the 1945 western white pine plantation in Squaw Valley. This planting was outside the control area and an advance check was necessary to determine how much protection work should be done.

The checkers worked in pairs in order to facilitate supervision and to overcome the fear of being alone in the woods. The internee checkers inspected the work areas of two German internee camps. The regular 16-foot wide running strip was used by each checker for his method of sampling.

All units of 20 acres or more that did not meet acceptable standards according to the checking data were reworked with the exception of parts of the Diamond Creek and Zero Creek areas on which additional work is planned next season.

The checkers located areas for the rework crews and in some instances supervised these crews.

The students were not as competent as checkers used in prewar seasons but the main objectives of finding the ribes and designating rework areas were accomplished. A number of sample strips were run by the Assistant Regional Leader and the checker foreman to determine the efficiency of the checkers' work. In all cases the data submitted by the checker were substantiated.

A five day schooling for the checkers was conducted by the checker foreman. Four days were spent doing actual field work. One day was used for instructions on mapping, the use of forms, and the interpretation of data.

PINE DISEASE SURVEY

A party of three men conducted a pine disease survey on three areas in the forest. These were the Experiment Station plantation area, parts of the Benton Creek and Fox Creek drainages. The results are tabulated below:

FOX CREEK

Number trees examined	429
Number trees infected	105
Percent trees infected	24
Percent trees infected with killing cankers	8

The Fox Creek area has been a difficult one to protect due to heavy logging and a consequent slow stabilization of ribes. It must be noted that only eight percent of the trees in the area were infected with cankers close to or on the trunks and classed as killing cankers. Eighty-five percent of the infection was centered on 1940 and 1941 wood.

EXPERIMENT STATION PLANTATION AREA

Number trees examined	414
Number trees infected	97
Percent trees infected	23
Percent trees infected with killing cankers	3

The western white pine on this area was planted in 1934. The trees have a vigorous growth and average better than 13 feet in height. Only three percent of the trees are infected with trunk or killing cankers. Cankers were cut out this fall.

BENTON CREEK AREA

Number trees examined	409
Number trees infected	86
Percent trees infected	24
Percent trees infected with killing cankers	16

Sixty-two percent of the infection found was on 1940 and 1941 wood. This area was last worked in 1942 which was one year too late to avert the heavy 1941 wave of infection. Only three percent of the infection has occurred on later than 1941 wood.

The 1945 surveys are similar to those run during the past three years. They show the same data regarding the year of wood hit by infection and an increasing growth in new white pine reproduction. The pattern of infection by the year of wood hit is shown in the following table:

Year of wood hit	1936	1937	1938	1939	1940	1941	1942
Percent of infection	2	4	4	14	38	31	7

During the past nine years pine disease surveys have been undertaken in most of the drainages in the forest. These surveys have been run through areas worked by the CCC, ERA, Eq-Coop., and regular Forest Service employees. An analysis of these successive pine disease surveys conducted on the same areas shows a gain of 5 1/2 percent in new white pine reproduction as against a loss of 14 percent from blister rust.

All cankers found on the trunks of the trees or on limbs within eighteen inches of the trunk were recorded as killing cankers. Only 40 percent of the infection found could be classed as killing cankers.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following table by cooperative agency and the type of appropriation:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945 KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 9,906.46
	Regular BLR-3-4	27,109.24
	Subtotal	\$ 37,015.70
State of Idaho Priest Lake Timber Protective Association	State BLR-3-4	\$ 3,030.66
	Private BLR-3-4	2,469.34
	Subtotal	\$ 5,500.00
Forest Service	Regular BLR-4	\$238,832.77
Total		\$281,348.47

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945 KANIKSU OPERATION

Item	Bureau of Entomology and Plant Quarantine				Forest Service	Total
	Regular BLR-1-4	Regular BLR-3-4	State and Private BLR-3-4	Total	Regular BLR-4	
Sal. perm. men	\$5,527.61			\$ 5,527.61	\$ 6,509.83	\$ 12,037.44
Sal. temp. men	697.06	\$ 7,758.55	\$ 900.91	9,356.52	28,304.35	37,660.87
Wages, temp. labs.	1,834.06	14,851.38	4,599.09	21,284.53	139,159.86	160,444.39
Subs. supplies	444.67	2,959.50		3,404.17	44,807.42	48,211.59
Equipment	135.72	454.27		589.99	15,410.65	16,000.64
Trucks						
Travel & transp.	773.71	430.31		1,204.02		1,204.02
Other supplies	493.63	655.23		1,148.86	4,640.66	5,789.52
Total	\$9,906.46	\$27,109.24	\$5,500.00	\$42,515.70	\$236,832.77	\$281,348.47

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
First	Plantation	1945-49	30	17	1,598	.57	53
	Cutover	1940-44	2,054	1,839	266,653	.90	130
	Cutover	1920-39	1,390	932	93,171	.67	67
	Reproduction	1910-39	881	1,167	628,384	1.32	713
	Pole		722	297	25,538	.41	35
	Miscellaneous		219	738	257,166	3.37	1,174
	Stream		67	321	100,116	4.79	1,494
	Total		5,363	5,311	1,372,626	.99	256
Second	Cutover	1940-44	352	199	7,107	.57	20
	Plantation	1940-44	2,603	1,389	45,757	.53	18
	Cutover	1920-39	522	371	34,486	.71	66
	Reproduction	1910-39	4,637	4,486	347,241	.97	75
	Pole		1,001	619	62,901	.62	63
	Mature		602	426	11,139	.71	19
	Stream		715	592	37,953	.83	53
	Total		10,432	8,082	546,584	.77	52
Third	Cutover	1920-39	1,718	1,484	72,073	.86	42
	Reproduction	1910-39	2,114	1,383	77,550	.65	37
	Pole		240	110	2,092	.46	9
	Mature		160	125	2,683	.78	17
	Stream		68	84	835	1.24	12
	Total		4,300	3,186	155,233	.74	36
All Workings	Plantation	1945-49	30	17	1,598	.57	53
	Cutover	1940-44	2,406	2,038	273,760	.85	114
	Plantation	1940-44	2,603	1,389	45,757	.53	18
	Cutover	1920-39	3,630	2,787	199,730	.77	55
	Reproduction	1910-39	7,632	7,036	1,053,175	.92	138
	Pole		1,963	1,026	90,531	.52	46
	Mature		762	551	13,822	.72	18
	Miscellaneous		219	738	257,166	3.37	1,174
	Stream		850	997	138,904	1.17	163
	Total		20,095	16,579	2,074,443	.83	103

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1945
KANIKSU OPERATION

State	Working	Class	Acres	Man-Days	Ribes	Per Acre	
						Man-Days	Ribes
Idaho	First	EQ-Coop.	72	84	26,190	1.17	364
		FS-Reg.	504	489	38,425	.97	76
		Total	576	573	64,615	.99	112
	Second	EQ-Coop.	1,736	1,667	50,655	.96	29
		FS-Reg.	1,762	1,465	103,162	.83	59
		Total	3,498	3,132	153,817	.90	44
	Third	EQ-Coop.	2,118	1,719	76,848	.81	36
		FS-Reg.	540	791	36,597	1.46	68
		Total	2,658	2,510	113,445	.94	43
	All Workings	EQ-Coop.	3,926	3,470	153,693	.89	39
		FS-Reg.	2,806	2,745	178,184	.98	64
		Total	6,732	6,215	331,877	.92	43
Washington	First	FS-Reg.	4,787	4,738	1,308,011	.99	273
	Second	FS-Reg.	6,934	4,950	392,767	.71	57
	Third	FS-Reg.	1,642	676	41,788	.41	25
	All Workings	FS-Reg.	13,363	10,364	1,742,566	.78	130
	Total						
Total	First	EQ-Coop.	72	84	26,190	1.17	364
		FS-Reg.	5,291	5,227	1,346,436	.99	254
		Total	5,363	5,311	1,372,626	.99	256
	Second	EQ-Coop.	1,736	1,667	50,655	.96	29
		FS-Reg.	8,696	6,415	495,929	.74	57
		Total	10,432	8,082	546,584	.77	52
	Third	EQ-Coop.	2,118	1,719	76,848	.81	36
		FS-Reg.	2,182	1,467	78,395	.67	36
		Total	4,300	3,186	155,233	.74	36
	All Workings	EQ-Coop.	3,926	3,470	153,693	.89	39
		FS-Reg.	16,169	13,109	1,920,750	.81	119
		Total	20,095	16,579	2,074,443	.83	103

TABLE 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
KANIKSU OPERATION

State	Working	Acres Worked										
		By Forest Service			By Bureau of Entomology and Plant Quarantine			Total				
		National Forest	Private	Total	State	Private	Total	Federal National Forest	Other			Total
									State	Private	Total	
Idaho	First	424	80	504		72	72	424		152	152	576
	Second	1,452	310	1,762	1,666	70	1,736	1,452	1,666	380	2,046	3,498
	Third	540		540	1,918	200	2,118	540	1,918	200	2,118	2,658
	Total	2,416	390	2,806	3,584	342	3,926	2,416	3,584	732	4,316	6,732
Washington	First	4,787		4,787				4,787				4,787
	Second	6,617	317	6,934				6,617		317	317	6,934
	Third	1,642		1,642				1,642				1,642
	Total	13,046	317	13,363				13,046		317	317	13,363
Total	First	5,211	80	5,291		72	72	5,211		152	152	5,363
	Second	8,069	627	8,696	1,666	70	1,736	8,069	1,666	697	2,363	10,432
	Third	2,182		2,182	1,918	200	2,118	2,182	1,918	200	2,118	4,300
	Total	15,462	707	16,169	3,584	342	3,926	15,462	3,584	1,049	4,633	20,095

TABLE 6

RIBES SPECIES ERADICATED, 1945
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Plantation (1945-49)	30	1,598			1,598
	Cutover (1940-44)	2,054	95,548	171,093	12	266,653
	Cutover (1920-39)	1,390	51,173	41,998		93,171
	Reproduction (1910-39)	881	27,206	601,178		628,384
	Pole	722	22,330	3,128	80	25,538
	Miscellaneous	219	10,028	247,138		257,166
	Stream	67	64,440		35,676	100,116
	All Types	5,363	272,323	1,064,535	35,768	1,372,626
Second	Cutover (1940-44)	352	3,019	4,088		7,107
	Plantation (1940-44)	2,603	11,560	34,197		45,757
	Cutover (1920-39)	522	22,971	11,159	356	34,486
	Reproduction (1910-39)	4,637	95,270	245,246	6,725	347,241
	Pole	1,001	13,765	49,136		62,901
	Mature	602	7,831	3,308		11,139
	Stream	715	31,356	362	6,235	37,953
	All Types	10,432	185,772	347,496	13,316	546,584
Third	Cutover (1920-39)	1,718	46,134	25,939		72,073
	Reproduction (1910-39)	2,114	8,799	68,751		77,550
	Pole	240	871	1,221		2,092
	Mature	160	1,712	971		2,683
	Stream	68	779	6	50	835
	All Types	4,300	58,295	96,898	50	155,233
All Workings	Plantation (1945-49)	30	1,598			1,598
	Cutover (1940-44)	2,406	98,567	175,181	12	273,760
	Plantation (1940-44)	2,603	11,560	34,197		45,757
	Cutover (1920-39)	3,630	120,278	79,096	356	199,730
	Reproduction (1910-39)	7,632	131,275	915,175	6,725	1,053,175
	Pole	1,963	36,966	53,485	80	90,531
	Mature	762	9,543	4,279		13,822
	Miscellaneous	219	10,028	247,138		257,166
	Stream	850	96,575	368	41,961	138,904
	All Types	20,095	516,390	1,508,919	49,134	2,074,443

TABLE 7

SUMMARY OF RIBES ERADICATION, 1923-1945
KANIKSU OPERATION

Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
						Man-Days	Ribes	Worked	Unworked
First	Plantation	1945-49	30	17	1,598	.57	53	30	473
	Cutover	1940-44	3,508	2,711	348,896	.77	99	3,508	40,526*
	Burn	1940-44	210	184	47,333	.88	225	210	
	Plantation	1940-44	2,631	1,317	490,404	.50	186	2,631	
	Cutover	1920-39	11,242	7,774	1,759,819	.69	157	10,668	25,311
	Reproduction	1910-39	165,145	116,680	32,509,633	.71	196	158,526	26,568
	Pole		122,751	42,813	6,045,812	.35	49	121,436	31,072
	Mature		141,985	30,312	5,783,074	.21	41	114,690	40,085
	Miscellaneous		6,954	4,215	1,697,669	.61	244	5,591	1,953
	Stream		22,281	49,216	9,260,987	2.21	416	21,637	7,555
Second	Total		472,737	255,239	57,745,225	.54	121	438,927	173,523
	Cutover	1940-44	352	199	7,107	.57	20	352	
	Plantation	1940-44	2,603	1,389	45,757	.53	18	2,603	
	Cutover	1920-39	6,548	8,227	1,735,137	1.26	265	6,548	
	Reproduction	1910-39	46,764	41,557	5,508,822	.89	118	45,856	
	Pole		18,668	9,366	730,616	.50	39	18,668	
	Mature		6,677	3,646	349,663	.55	52	6,677	
	Miscellaneous		808	386	41,065	.48	51	808	
	Stream		7,734	11,451	1,206,668	1.48	156	7,679	
	Total		90,154	76,221	9,624,835	.85	107	89,191	
Third	Cutover	1920-39	3,622	3,670	262,485	1.01	72	3,622	
	Reproduction	1910-39	13,881	13,707	1,123,365	.99	81	13,881	
	Pole		854	335	23,056	.39	27	854	
	Mature		464	395	54,265	.85	117	464	
	Miscellaneous		179	122	3,026	.68	17	179	
	Stream		1,108	1,435	61,715	1.30	56	1,108	
	Total		20,108	19,664	1,587,912	.98	76	20,108	
All Workings	Plantation	1945-49	30	17	1,598	.57	53	30	
	Cutover	1940-44	3,860	2,910	356,003	.75	92	3,860	
	Burn	1940-44	210	184	47,333	.88	225	210	
	Plantation	1940-44	5,234	2,706	536,161	.52	102	5,234	
	Cutover	1920-39	21,412	19,671	3,757,441	.92	175	20,838	
	Reproduction	1910-39	225,790	171,944	38,941,820	.76	172	218,263	
	Pole		142,273	52,514	6,799,484	.37	48	140,958	
	Mature		149,126	34,353	6,197,002	.23	41	121,831	
	Miscellaneous		7,941	4,723	1,741,760	.59	219	6,578	
	Stream		31,123	62,102	10,529,370	2.00	338	30,424	
All Workings	Total		586,999	331,124	68,897,972	.60	117	548,226	

*Includes 1945 unworked cutover 3,500 acres.

TABLE 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923 - 1945
KANIKSU OPERATION

State	Class	Gross Acres	Man-Days	Total Ribes	Per Acre	
					Man-Days	Ribes
Idaho	EQ-Reg.	18,796	6,844	1,066,689	.36	57
	EQ-Coop.	129,371	48,636	10,791,502	.38	83
	EQ-Emerg.	99,041	68,851	11,333,497	.70	114
	FS-Reg.	40,746	40,287	4,648,928	.99	114
	FS-Emerg.	99,269	38,823	8,788,474	.39	89
	CCC	62,419	50,478	8,451,835	.81	136
	Total	449,642	253,919	45,080,925	.56	100
Washington	EQ-Emerg.	31,629	19,288	6,754,071	.61	214
	FS-Reg.	47,034	38,826	9,562,483	.83	203
	FS-Emerg.	36,366	14,386	4,013,260	.40	110
	CCC	22,328	24,705	3,487,233	1.11	156
	Total	137,357	97,205	23,817,047	.71	175
Idaho Washington	EQ-Reg.	18,796	6,844	1,066,689	.36	57
	EQ-Coop.	129,371	48,636	10,791,502	.38	83
	EQ-Emerg.	130,670	88,139	18,087,568	.67	138
	FS-Reg.	87,780	79,113	14,211,411	.90	162
	FS-Emerg.	135,635	53,209	12,801,734	.39	94
	CCC	84,747	75,183	11,939,066	.89	141
	Total	586,999	331,124	68,897,972	.60	117

TABLE 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923 - 1945
KANIKSU OPERATION

State	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Idaho	National Forest	176,562	35,952	2,635	215,149	59,147	235,709
	Public Domain	54			54	80	134
	Subtotal Federal	176,616	35,952	2,635	215,203	59,227	235,843
	State	104,781	18,220	9,632	132,633	30,256	135,037
	Private	64,932	9,869	1,408	76,209	45,155	110,087
	Subtotal Other	169,713	28,089	11,040	208,842	75,411	245,124
	Total	346,329	64,041	13,675	424,045	134,638	480,967
Washington	National Forest	85,735	23,735	6,241	115,711	34,913	120,648
	Subtotal Federal	85,735	23,735	6,241	115,711	34,913	120,648
	State	2,080			2,080		2,080
	Private	4,783	1,415	192	6,390	3,972	8,755
	Subtotal Other	6,863	1,415	192	8,470	3,972	10,835
	Total	92,598	25,150	6,433	124,181	38,885	131,483
	Total	262,297	59,687	8,876	330,860	94,060	356,357
Total	National Forest	262,297	59,687	8,876	330,860	94,060	356,357
	Public Domain	54			54	80	134
	Subtotal Federal	262,351	59,687	8,876	330,914	94,140	356,491
	State	106,861	18,220	9,632	134,713	30,256	137,117
	Private	69,715	11,284	1,600	82,599	49,127	118,842
	Subtotal Other	176,576	29,504	11,232	217,312	79,393	255,959
	Total	438,927	89,191	20,108	548,226	173,523	612,450

TABLE 10

RIBES SPECIES ERADICATED, 1923 - 1945
KANIKSU OPERATION

Working	Eradication Type	Gross Acres	Ribes Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	
First	Plantation (1945-49)	30	1,598					1,598
	Cutover (1940-44)	3,508	141,218	207,666	12			348,896
	Burn (1940-44)	210	18,015	29,318				47,333
	Plantation (1940-44)	2,631	72,450	417,954				490,404
	Cutover (1920-39)	11,242	702,928	1,009,008	47,883			1,759,819
	Reproduction (1910-39)	165,145	9,329,687	22,750,897	226,102	2,947		32,309,633
	Pole	122,751	2,906,595	2,905,074	208,515	21,714	3,914	6,045,812
	Mature	141,985	4,011,599	1,614,889	154,559		2,027	5,783,074
	Miscellaneous	6,954	348,323	1,280,809	68,537			1,697,669
	Stream	22,281	4,925,272	425,512	3,890,619		19,584	9,260,987
	All Types	476,737	22,457,685	30,641,187	4,596,227	24,661	25,525	57,745,225
	Total							
Second	Cutover (1940-44)	352	3,019	4,088				7,107
	Plantation (1940-44)	2,603	11,560	34,197				45,757
	Cutover (1920-39)	6,548	382,363	1,338,470	14,304			1,735,137
	Reproduction (1910-39)	46,764	1,586,988	3,879,898	41,936			5,508,822
	Pole	18,668	328,034	391,439	11,143			730,616
	Mature	6,677	180,149	165,433	4,081			349,663
	Miscellaneous	808	24,827	15,363	875			41,065
	Stream	7,734	670,890	74,101	461,677			1,208,668
	All Types	90,154	3,187,830	5,902,989	534,016			9,624,835
	Cutover (1920-39)	3,622	150,804	106,680	5,001			262,485
	Reproduction (1910-39)	13,881	315,668	805,066	2,631			1,123,365
	Total							
Third	Pole	854	8,178	14,753	125			23,056
	Mature	464	7,098	47,167				54,265
	Miscellaneous	179	1,109	1,893	24			3,026
	Stream	1,108	46,248	4,215	11,252			61,715
	All Types	20,108	529,105	979,774	19,033			1,527,912
	Plantation (1945-49)	30	1,598					1,598
	Cutover (1940-44)	3,860	144,237	211,754	12			356,003
	Burn (1940-44)	210	18,015	29,318				47,333
	Plantation (1940-44)	5,234	84,010	452,151				536,161
	Cutover (1920-39)	21,412	1,236,095	2,454,158	67,188			3,757,441
	Reproduction (1910-39)	225,790	11,232,343	27,435,861	270,669	2,947		38,941,820
	Pole	142,273	3,242,807	3,311,266	219,783	21,714	3,914	6,799,484
All Workings	Mature	149,126	4,198,846	1,827,489	158,640		2,027	6,187,008
	Miscellaneous	7,941	374,259	1,298,065	69,436			1,741,760
	Stream	31,123	5,642,410	503,828	4,363,548		19,584	10,522,370
	All Types	586,999	26,174,620	37,523,890	5,149,276	24,661	25,525	68,897,972
	Total							

BLISTER RUST CONTROL WORK, MONTANA OPERATION, 1945

By

A. S. Skoglund, Operation Supervisor

INTRODUCTION

Blister rust control operations were conducted on both the Cabinet and Kootenai National Forests.

A total of 5,012 acres were worked with an expenditure of 8,089 man-days of labor. The net acres on the Montana Operation are 132,344 acres initially worked and 16,526 acres reworked. 75,709 acres are still in need of initial ribes eradication.

Mexican Nationals were used as a class of labor for the first time in control operations in Montana. The group reporting for the spring period performed very well but the group returning around July 20 were a very mediocre class of labor. Teen-age high school boys made up the remainder of the workers.

The progress of work was somewhat disappointing this year. A late spring prevented crews from getting started effectively until after the first week of May. A dry summer with numerous fires commanded the major efforts of the crews from July 21 until after Labor Day. A total of 8,089 man-days were spent on blister rust while 7,737 man-days were spent on fires. The progress of 1945 work by classes of labor is as follows:

Forest	Labor	Number Workers	Ribes Eradication			Canker Elimination	
			Acres	Man-Days	Ribes	Trees Treated	Man-Days
Cabinet	Student	80	538	1,161	32,565		
	Mexican Nationals	100	886	2,589	179,035	36,000	300
Kootenai	Student	90	1,885	2,516	150,562	600	10
	Mexican Nationals	71	1,703	1,823	91,458	3,800	45

ORGANIZATION AND ADMINISTRATION

The respective forests were responsible for the administration and maintenance of the camps and technical supervision was provided by the Bureau of Entomology and Plant Quarantine.

The field organization was as follows:

Bureau of Entomology and Plant Quarantine

A. S. Skoglund, Operation Supervisor

U. S. Forest Service

L. J. Cummings, Forest Officer,
Cabinet Forest

H. E. Ahlskog, Forest Officer,
Kootenai Forest

Emil Keck, Unit Supervisor
Kootenai Forest

Camp Locations

Drainage	<u>T.</u>	<u>R.</u>	<u>S.</u>	Date <u>Established</u>	Date <u>Closed</u>	Class of <u>Labor</u>	<u>Size</u>
<u>Cabinet National Forest</u>							
Big Creek	19N	30W	27	June 1	July 20	Boys	30
				April 3	Sept. 28	Mex.	100
Rainy Creek	19N	32W	13	June 26	Aug. 14	Boys	50
<u>Kootenai National Forest</u>							
Yaak River	34N	33W	10	April 3	May 28	Mex.	50
Stanley Creek	29N	33W	7	June 1	Aug. 24	Boys	45
				May 5	Sept. 28	Mex.	35
Star Creek	32N	35W	14	June 1	July 25	Boys	45
Burnt Creek	34N	34W		July 20	Aug. 25	Mex.	35
Red Top Creek	34N	34W	1	July 20	Sept. 21	Mex.	36

LOCATION AND DESCRIPTION OF AREAS

In the Cabinet Forest work was performed in the vicinity of Haugan and on Rainy Creek. Both initial and second workings were performed around Haugan Lookout. Ribes viscosissimum was the only species present in this area. Initial work was performed on the area immediately east and north of Rivers Peak Lookout. This is an area of reproduction originating on a 1919 reburn of a 1910 burn with heavy concentrations of R. viscosissimum and is adjacent to a thrifty 1924 plantation. Stream type along lower Big Creek was also mopped up. These areas are included in secs. 15, 20, 21, 22, 26, 27, 28, 29, 31, 32, 33 and 34 on T. 19 N., R. 30 W., and in secs. 5 and 6 of T. 18 N., R. 30 W. Some initial and rework was carried on in Rainy Creek and is located in secs. 14 and 23 of T. 19 N., R. 32 W.

Initial working was accomplished on the Star Creek plantation unit in the Kootenai Forest. This area was planted just prior to working and contained relatively few ribes. The workings are contained within secs. 11, 12, and 14 of T. 32 N., R. 35 W. and secs. 14, 23, 26 and 27 in T. 60 N., R. 3 E., B.P.M.

Some work was done in sec. 1 of T. 34 N., R. 33 W., of Burnt Creek. Only R. lacustre was found in the work area. This drainage contains some very fine bodies of 45 year old white pine pole intermingled with some thrifty reproduction.

Second working was given to the 45 year pole stands in Red Top Creek with R. lacustre only being found. This working was within sec. 31 of T. 35 N., R. 33 W., sec. 36 of T. 35 N., R. 24 W., secs. 1, 11 and 12 of T. 34 N., R. 24 W., and sec. 6 of T. 34 N., R. 33 W.

A small amount of work was done in the Yaak River stream type in sec. 10 of T. 34 N., R. 33 W.

The few remaining ribes were removed from the fine pole stand in upper Thicket Creek. R. viscosissimum were also removed from along the roadside leading to Keeler Mountain Lookout. This work was included in secs. 1, 2, 3, 10, 11, and 12 of T. 29 N., R. 34 W.

First working was performed on Lake Creek drainage in secs. 5, 6, 7 and 8 of T. 29 N., R. 33 W. This area was cut of all merchantable white pine in 1939, resulting in clear cut in portions to very little disturbance in other portions. The lighter cuts for the most part left a good stocking of white pine pole and reproduction with few ribes becoming established. The clear cut portions contained numerous R. irriguum and R. inerme. Heavy concentrations of infected ribes occurred along the major stream.

METHODS AND EQUIPMENT

Standard methods were used supplemented by slight variations to overcome difficulties caused by the influences of site, season and labor deficiencies. One variation was the adoption of the flanker checker system to work the Star Creek plantation area of 4 or 5 ribes per acre. The timing of the operation was one of the keys to the practicability of the plan with the area being left as long as possible to allow for more height growth to the bushes but completing operations prior to the full season development of annuals and brush. The operation was successful in that practically all ribes were removed at a very low man-day cost.

Proper timing of ribes eradication in brush areas can serve to increase efficiency and reduce cost. In light ribes areas and in case of second working, ribes eradication should be completed early in the season prior to full foliation of the brush. Work in the brush areas with many ribes can be performed later in the season without much loss in efficiency since the pulling of ribes rather than searching is the major factor.

A small patch of R. viscosissimum seedlings on cut-over lands was sprayed with ammonium sulfamate early in September. The results of this treatment may not be observed until summer of next year. The problem of eradication of small ribes on cut-over lands may be materially lessened if spraying is successful.

CHECKING

All areas containing over 10 ribes per acre were given a regular check following work by crews.

Areas containing around 3 ribes per acre were checked by the flanker method. A checker laying a string line by means of a string ball carrier was assisted by 2 flankers working on the same side of the checker. This enabled them to always work between string lines. These areas were checked prior to full season development of brush.

Checking of areas containing between 3 to 10 ribes per acre has been deferred until next spring.

CONTROL STATUS

In the Cabinet Forest the status of control has not changed materially from that of last year.

The amount of work performed in Rainy Creek area was not significant in the reduction of ribes and undoubtedly more damage occurred this past season.

A disease survey performed on the 1924 plantation in Big Creek indicated about 36 percent of the trees are infected. The removal of the ribes east of Rivers Peak Lookout should reduce the spread of rust into this stand. The completion of this work next season should afford protection from any further serious damage.

Considerable infection in the first few chains from the stream type is found on the left hand fork of the West Fork of Big Creek. This area should be worked next season to prevent any further build-up. No appreciable damage has occurred in the right hand fork and the planned extension of the area further up the creek should prevent further damage.

The percentage of infection found in the seed beds at Savenac Nursery has dropped each year since the first working of Haugan Lookout area. Only one infected specimen was found out of 8,500 2-year old trees examined. Although a favorable spread year has not occurred since the lookout area was worked, present results are very encouraging and indicate that previous infection must have come from the large volume of spores originating on the masses of ribes which were formerly around the lookout. The second working in 1945 should prevent any serious future spread to the seedlings.

Very heavy pine infection occurs in the Lake Creek drainage of the Kootenai Forest. A high percentage of the cankers are trunk cankers and have resulted, or shortly will result, in the killing of many trees. The zone of infection spreads out from the stream type for a distance of 20 chains. Large concentrations of highly susceptible stream type ribes occur along this stream, and could best be removed by bulldozer. Due to intermingled ownership cooperative action is necessary, and steps have already been instituted to afford a satisfactory solution. Unprotected, this area would result in a serious center of infection capable of causing considerable damage to adjoining stands.

The work performed this year on Thicket Creek should afford ample protection to this stand. The plantation in a broadcast burn area on Star Creek has been afforded protection. Additional work will be necessary along the upper rim of the plantation and careful and periodic inspections should be made for possible long-distance spread from Raymond Creek.

Considerable advance survey was run in Burnt Creek. Last year's observations were borne out in that it contains an excellent stand of white pine of reproduction and pole size. This same type of stand extends up the Yaak River into the Lucky and Little Creek drainages. Very little infection has been found and with the anticipated program little damage is expected. Vivian Creek, a branch of Burnt Creek, is probably the most critical area as it contains R. viscosissimum intermingled with white pine production on a single burn.

Very little infection has been found in the 45 year pole stand in Red Top Creek and except for an occasional isolated hit in worked area, the only infection found was in an unworked drainage below Red Top Lookout.

Of the 5,012 acres worked this season 2,362 acres are on maintenance, 1,639 acres are on post check and 1,011 acres are on rework.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs by cooperative agency and type of appropriation is shown in the following tabulations:

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945 MONTANA OPERATION

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 2,609.28
Cabinet National Forest	Regular BLR-4	91,551.98
Kootenai National Forest	Regular BLR-4	64,652.50
Total		\$158,813.76

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945 MONTANA OPERATION

Item	Bureau of Entomology and Plant Quarantine	Cabinet National Forest	Kootenai National Forest	Total
	Regular BLR-1-4	Regular BLR-4	Regular BLR-4	
Sal., perm. men	\$2,261.03	\$ 2,753.98	\$ 2,761.76	\$ 7,776.82
Sal., temp. men		1,300.00	4,967.73	6,267.73
Wages, temp. labs.		58,980.00	33,354.97	97,334.97
Subs. supplies		15,642.00	11,224.70	26,866.70
Equipment		9,148.00	2,362.96	11,510.96
Travel & transp.	348.20	1,417.00	1,207.83	2,973.03
Other supplies		2,311.00	3,772.55	6,083.55
Total	\$2,609.28	\$91,551.98	\$64,652.50	\$158,813.76

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
MONTANA OPERATION

Forest	Working	Eradication Type	Year of Origin	Acres	Man-Days	Ribes	Per Acre	
							Man-Days	Ribes
Cabinet	First	Reproduction	1910-39	565	1,751	123,116	3.10	218
		Stream (1)		18	267	26,220	14.83	1,457
		Total		583	2,018	149,336	3.45	256
	Second	Reproduction	1910-39	325	1,008	38,241	3.10	118
		Total		325	1,008	38,241	3.10	118
	Third and Other	Reproduction	1910-39	137	103	2,124	.75	16
		Stream (3)		379	621	21,899	1.64	58
	All Workings	Total		516	724	24,023	1.40	47
		Reproduction	1910-39	1,027	2,862	163,481	2.79	159
		Stream (4)		397	888	48,119	2.24	121
		Total		1,424	3,750	211,600	2.53	149
Kootenai	First	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	74	43	706	.58	10
		Pole		628	252	22,520	.40	36
		Mature		286	5		.02	
		Stream		243	1,298	112,165	5.34	462
		Total		2,595	2,464	191,216	.95	74
	Second	Reproduction	1910-39	375	202	5,158	.54	14
		Pole		339	494	13,135	1.46	39
		Stream		124	889	21,413	7.17	173
		Total		838	1,585	39,706	1.89	47
	Third	Pole		133	276	10,360	2.08	78
		Stream		22	14	738	.64	34
		Total		155	290	11,098	1.67	72
	All Workings	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	449	245	5,864	.55	13
		Pole		1,100	1,022	46,015	.93	42
		Mature		286	5		.02	
		Stream		382	2,201	154,316	5.66	345
		Total		3,586	4,339	242,020	1.21	67
All Forests	First	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	639	1,794	123,822	2.81	194
		Pole		628	252	22,520	.40	36
		Mature		286	5		.02	
		Stream (1)		261	1,565	138,395	6.00	530
		Total		3,178	4,482	340,552	1.41	107
	Second	Reproduction	1910-39	700	1,210	43,399	1.73	62
		Pole		339	494	13,135	1.46	39
		Stream		124	889	21,413	7.17	173
		Total		1,163	2,593	77,947	2.23	67
	Third and Other	Reproduction	1910-39	137	103	2,124	.75	16
		Pole		133	276	10,360	2.08	78
		Stream (3)		401	635	22,637	1.58	56
		Total		671	1,014	35,121	1.51	52
	All Workings	Plantation	1945-49	244	125	5,462	.51	22
		Cutover	1920-39	1,120	741	50,363	.66	45
		Reproduction	1910-39	1,476	3,107	169,345	2.11	115
		Pole		1,100	1,022	46,015	.93	42
		Mature		286	5		.02	
		Stream (4)		786	3,089	182,435	3.93	232
		Total		5,012	8,089	453,620	1.61	91

Chemical work included above:

	Acres		Gallons
		Man-Days	Spray
(1)	3	7	65
(5)	15	31	165
(4)	18	38	230

TABLE 4

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1945
MONTANA OPERATION

Forest	Working	Acres Worked By Forest Service		
		National Forest	Private	Total
Cabinet	First	453	130	583
	Second	267	58	325
	Third	301	215	516
	Total	1,021	403	1,424
Kootenai	First	1,667	928	2,595
	Second	822	16	838
	Third	155		155
	Total	2,644	944	3,588
All Forests	First	2,120	1,058	3,178
	Second	1,089	74	1,163
	Third	456	215	671
	Total	3,665	1,347	5,012

TABLE 5

RIBES SPECIES ERADICATED, 1945
MONTANA OPERATION

Forest	Working	Eradication Type	Acres	Ribes Species				Total Ribes
				Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inermis	
Cabinet	First	Reproduction (1910-39)	565	11,729	111,397			123,116
		Stream	18	4,332		705	20,548	25,585
		All Types	583	16,061	111,397	705	20,548	148,711
	Second	Reproduction (1910-39)	325	600	37,641			38,241
		All Types	325	600	37,641			38,241
		Stream	137	12	2,112			2,124
	Third	Reproduction (1910-39)	379	13,045		2,512	9,342	21,899
		All Types	379	13,045	2,112	2,512	9,342	24,015
		Stream	1,087	18,341	151,140			169,568
	All Workings	Reproduction (1910-39)	397	15,014		3,217	29,888	48,119
		All Types	1,424	27,355	151,140	3,217	29,888	211,600
		Stream	244	814	4,648			5,466
Kootenai	First	Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	74	704	2			706
		Pole	628	14,841	7,679			22,520
		Mature	286					
		Stream	243	96,803	345		15,017	112,165
		All Types	2,595	133,096	48,108		15,017	196,230
	Second	Reproduction (1910-39)	375	5,158				5,158
		Pole	339	12,315	820			13,135
		Stream	124	21,413				21,413
		All Types	638	38,886	820			39,706
	Third	Pole	133	9,631	729			10,360
		Stream	22	725	13			738
		All Types	155	10,356	742			11,098
	All Workings	Plantation (1945-49)	244	814	4,648			5,466
		Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	449	5,862	2			5,864
		Pole	1,100	36,787	9,228			46,015
		Mature	286					
		Stream	397	118,941	359		15,017	134,317
All Forests	First	All Types	3,588	152,338	44,665		15,017	242,020
		Plantation (1945-49)	244	814	4,648			5,466
		Cutover (1920-39)	1,120	19,934	30,429			50,363
		Reproduction (1910-39)	639	12,433	111,389			123,821
		Pole	628	14,841	7,679			22,520
		Mature	286					
	Second	Stream	241	101,772	345	705	32,683	132,503
		All Types	3,178	149,794	154,490	705	32,583	340,576
		Reproduction (1910-39)	700	5,758	37,641			43,399
		Pole	339	12,315	820			13,135
		Stream	124	21,413				21,413
		All Types	1,153	39,486	38,461			77,947
	Third	Reproduction (1910-39)	137	12	2,112			2,124
		Pole	133	9,631	729			10,360
		Stream	401	10,770	15	2,512	9,342	22,637
		All Types	671	20,413	2,554	2,512	9,342	35,121
		Plantation (1945-49)	244	814	4,648			5,466
		Cutover (1920-39)	1,120	19,934	30,429			50,363
	All Workings	Reproduction (1910-39)	1,476	18,203	151,142			169,345
		Pole	1,100	36,787	9,228			46,015
		Mature	286					
		Stream	725	133,955	222	3,217	44,905	182,319
		All Types	5,012	303,693	195,805	3,217	44,905	443,620
		Stream						

TABLE 6

SUMMARY OF RIBES ERADICATION, 1929-1945
MONTANA OPERATION

Forest	Working	Eradication Type	Year of Origin	Gross Acres Worked	Man-Days	Ribes	Per Acre		Net Acreage Remaining	
							Man-Days	Ribes	Worked	Unworked
Cabinet	First	Reproduction	1910-39	34,930	33,121	6,261,168	.95	179	34,351	6,755
		Pole		25,959	9,213	1,745,222	.35	67	25,890	7,134
		Mature		9,297	4,447	1,064,328	.48	114	9,277	1,792
		Miscellaneous		4,900	2,230	596,499	.46	122	4,637	
		Stream (1)		5,019	16,011	3,617,610	3.19	721	5,019	
		Total		80,105	65,022	13,285,490	.81	122	78,322	15,221
	Second	Reproduction	1910-39	5,599	8,473	800,441	1.51	143	5,599	
		Pole		1,108	1,423	101,767	1.28	92	1,108	
		Mature		28	27	1,799	.96	64	28	
		Miscellaneous		33	34	1,503	1.03	46	33	
		Stream (2)		2,990	5,395	558,353	1.80	187	2,990	
		Total		9,758	15,352	1,463,853	1.27	180	9,758	
	Third and Other	Reproduction	1910-39	1,314	1,079	83,778	.82	64	1,314	
		Pole		125	149	7,256	1.19	58	125	
		Stream (3)		2,911	3,621	174,182	1.24	60	2,911	
		Total		4,350	4,849	225,216	1.11	61	4,350	
	All Workings	Reproduction	1910-39	41,843	42,673	7,145,397	1.02	171	41,274	
		Pole		27,192	10,785	1,854,908	.40	68	26,903	
		Mature		9,325	4,474	1,066,127	.48	114	9,305	
		Miscellaneous		4,933	2,264	598,002	.46	121	4,690	
		Stream (4)		10,920	25,027	4,350,145	2.29	599	10,920	
		Total		94,213	85,225	15,014,569	.90	155	93,052	
Kootenai	First	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1940-44							5,739
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	3,761
		Reproduction	1910-39	13,238	8,743	1,079,961	.66	82	12,504	10,318
		Pole		20,698	8,098	873,654	.39	42	19,786	23,526
		Mature		17,077	4,372	594,358	.26	35	16,072	16,704
		Miscellaneous		346	95	7,956	.27	23	346	
		Stream		3,472	10,444	1,445,685	3.01	416	3,444	
		Total		56,239	32,636	4,057,923	.58	72	53,350	50,048
	Second	Reproduction	1910-39	716	367	30,680	.51	43	716	
		Pole		1,118	1,101	53,625	.98	48	1,118	
		Stream		657	1,694	84,288	2.88	189	429	
		Total		2,491	3,162	1,530,651	1.27	68	2,263	
	Third	Pole		133	276	10,360	2.08	78	133	
		Stream		22	14	738	.64	34	22	
		Total		155	290	11,098	1.87	72	155	
	All Workings	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	
		Reproduction	1910-39	13,954	9,110	1,110,641	.65	80	13,220	
		Pole		21,949	9,475	937,639	.43	43	21,037	
		Mature		17,077	4,372	594,358	.26	35	16,072	
		Miscellaneous		346	95	7,956	.27	23	346	
		Stream		4,151	12,152	1,530,651	2.93	369	2,696	
		Total		58,885	36,088	4,237,644	.61	72	55,778	
All Forests	First	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1940-44							5,739
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	3,761
		Reproduction	1910-39	48,168	41,864	7,341,129	.87	152	46,865	17,083
		Pole		46,657	17,311	2,619,539	.37	56	45,456	30,660
		Mature		26,374	8,819	1,658,686	.33	63	25,349	18,496
		Miscellaneous		5,246	2,325	604,455	.44	115	5,003	
		Stream (1)		8,491	26,455	5,063,255	3.12	596	8,263	
		Total		136,344	97,858	17,343,443	.72	127	132,344	75,709
	Second	Reproduction	1910-39	6,315	8,840	831,121	1.40	132	6,315	
		Pole		2,226	2,524	155,392	1.13	70	2,226	
		Mature		28	27	1,799	.96	64	28	
		Miscellaneous		33	34	1,503	1.03	46	33	
		Stream (2)		3,647	7,089	642,641	1.94	176	3,449	
		Total		12,249	18,514	1,632,456	1.51	133	12,021	
	Third and Other	Reproduction	1910-39	1,314	1,079	83,778	.82	64	1,314	
		Pole		258	425	17,616	1.65	68	258	
		Stream (3)		2,933	3,635	174,990	1.24	60	2,933	
		Total		4,505	5,139	276,314	1.24	61	4,505	
	All Workings	Plantation	1945-49	244	125	5,462	.51	22	244	
		Cutover	1920-39	1,164	759	50,937	.65	44	1,164	
		Reproduction	1910-39	55,797	51,783	8,256,028	.93	148	54,494	
		Pole		49,141	20,260	2,792,547	.41	57	47,940	
		Mature		26,402	8,846	1,660,485	.34	63	25,377	
		Miscellaneous		5,279	2,359	605,958	.45	115	5,036	
		Stream (4)		15,071	37,179	5,980,796	2.47	370	14,615	
		Total		153,098	121,311	19,252,213	.79	126	148,270	

Chemical work included above:

	Acres	Man-Days	Gallons Spray
(1)	707	1,964	57,890
(2)	178	379	11,146
(3)	27	179	3,710
(4)	912	2,522	72,746

TABLE 7

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1945
MONTANA OPERATION

Class	Gross Acres	Man-Days	Total Ribes	Gallons Spray	Per Acre Man-Days	Ribes
BQ-Reg.	2,002	3,295	761,710	34,795	1.65	390
BQ-Emergency	66,076	30,787	5,775,415	1,330	.47	87
FS-Reg.	34,863	39,169	3,875,356	8,658	1.12	111
FS-Emergency	35,712	35,620	7,367,723	21,638	1.00	206
CCC	14,475	12,440	1,472,009	6,325	.86	102
Total	153,098	121,311	19,252,213	72,746	.79	126

TABLE 8

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1945
MONTANA OPERATION

Forest	Ownership	Net Acres in Control Area					
		Acres Worked				Acres Unworked	Total Acres
		First	Second	Third	Total		
Cabinet	National Forest	61,995	7,779	2,584	72,358	11,599	73,594
	Public Domain	40			40		40
	Subtotal Federal	62,035	7,779	2,584	72,398		73,634
	State	734	1		735		734
	Private	16,215	1,978	1,766	19,959	4,062	20,277
	Subtotal Other	16,949	1,979	1,766	20,694	4,062	21,011
	Total	78,984	9,758	4,350	93,092	15,661	94,645
Kootenai	National Forest	50,234	1,987	155	52,376	48,823	99,057
	State					173	173
	Private	3,126	276		3,402	11,052	14,178
	Subtotal Other	3,126	276		3,402	11,225	14,351
	Total	53,360	2,263	155	55,778	60,048	113,408
All Forests	National Forest	112,229	9,766	2,739	124,734	60,422	172,651
	Public Domain	40			40		40
	Subtotal Federal	112,269	9,766	2,739	124,774		172,691
	State	734	1		735	173	907
	Private	19,341	2,254	1,766	23,361	15,114	34,455
	Subtotal Other	20,075	2,255	1,766	24,096	15,287	35,362
	Total	132,344	12,021	4,505	148,870	75,709	208,053

TABLE 9

RIBES SPECIES ERADICATED, 1928-1945
MONTANA OPERATION

Working	Eradication Type	Gross Acres	Ribes Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Plantation (1945-49)	244	814	4,648						5,462
	Cutover (1920-39)	1,164	20,337	30,431		72	97			50,937
	Reproduction (1910-39)	46,168	3,408,768	3,752,430	4,714	55,752	114,802	3,518	1,145	7,341,129
	Pole	46,657	1,471,173	959,770	200	103,756	84,338	302		2,619,539
	Mature	26,374	1,452,632	178,729	259	11,050	8,729	7,257		1,638,686
	Miscellaneous	5,246	291,724	295,188		12,381	5,162			604,455
	Stream	8,491	3,264,543	120,112	266,711	1,351,897	5,744	33,105	21,123	5,063,235
	All Types	136,344	9,909,991	5,341,308	271,824	1,534,938	218,872	44,182	22,268	17,843,443
Second	Reproduction (1910-39)	6,315	468,510	339,826	4,860	4,668	10,666		2,591	831,121
	Pole	2,226	116,481	31,452	119	6,419	921			155,392
	Mature	28	1,799							1,799
	Miscellaneous	33	877	626						1,503
	Stream	3,647	217,002	5,776	48,203	352,846	10,975		7,634	648,641
	All Types	12,249	604,669	377,680	53,187	363,933	22,562		10,425	1,632,456
Third	Reproduction (1910-39)	1,314	47,612	35,759	93		200		114	83,778
	Pole	258	11,161	5,789		660	6			17,616
	Stream	2,933	33,192	464	38,417	87,105			15,742	174,920
	All Types	4,505	91,965	42,012	38,510	87,765	206		15,856	276,314
	Plantation (1945-49)	244	814	4,648						5,462
All Workings	Cutover (1920-39)	1,164	20,337	30,431		72	97			50,937
	Reproduction (1910-39)	55,797	3,924,890	4,128,015	9,667	60,420	125,688	3,518	3,850	8,256,028
	Pole	49,141	1,598,815	997,011	319	110,835	85,265	302		2,792,547
	Mature	26,402	1,454,431	178,729	259	11,080	8,729	7,257		1,660,485
	Miscellaneous	5,279	292,601	295,814		12,381	5,162			605,958
	Stream	15,071	3,514,737	126,352	353,336	1,791,848	16,719	33,105	44,699	5,880,796
	All Types	138,098	10,806,625	5,721,000	363,581	1,886,636	241,640	44,182	48,549	19,252,213

BLISTER RUST CONTROL, MOUNT RAINIER NATIONAL PARK, 1945

By

M. C. Riley, Operation Supervisor

Ribes eradication work for the control of white pine blister rust on Mount Rainier National Park was conducted by a crew with top strength of 30 men and was financed with regular funds allotted to the National Park Service. Work was performed entirely on the Longmire control area which also includes the white pine stand in and adjacent to the Silver Forest. The worked area is situated in unsurveyed secs. 13, 14, 15, 22, 23, 24, 28, 29, 32 and 33, T. 15 N., R. 8 E., Willamette Meridian. Crews started on June 7 and continued through the month of August.

No experienced blister rust foreman was available. The late spring caused considerable difficulty at the start of the work since ribes were not sufficiently leafed out for identification except in relatively small patches. This necessitated moving the crew many times and made for slow progress during June. As the new foreman and his assistant became more familiar with the work and the area, more satisfactory results were obtained. The month of August saw much time spent on fire outside the National Park and this interfered materially with the orderly progress of the work.

While the work of the 1945 season was not of a quality comparable with that of the previous two seasons, it is felt that no further ribes eradication work will be necessary on the Longmire control area until 1947. This is one year earlier than was anticipated when the schedule of recommendations and estimates in the 1944 annual report was drawn up. This is partially due to poor work on some small patches where time did not permit a mop-up job and partially to a seedling problem in connection with some Ribes acerifolium areas on the north side of the Silver Forest. There is not enough of this work to warrant training a crew in 1946 and it can very well be done in connection with the proposed program recommended for the 1947 field season.

A new method of marking crew lanes with string was tried out for a short period this year for crews working in adjoining strips. It consisted of a string man with each crew using a "trailer string", dragging about fifty feet of twine along to mark the strip, in place of laying the string in advance as had been done previously. The system was not satisfactory because the attention of the string man was divided between pulling ribes and watching to see that he was not too far ahead of the adjoining crew and crews could not be so organized that slow men were not retarding faster men and causing considerable lost time.

It will be noted, in comparing the figures on a "per acre" basis in this report with those for 1944, that stream type shows a reduction in ribes removed. Of the stream type worked this year a considerable portion will not have to be worked for seven or eight years unless some unforeseen disturbance occurs. The same can be said of at least one-half of the pole area worked this season. The higher ribes per acre figure is caused by the seedling problem mentioned above.

RECOMMENDATIONS

No ribes eradication work is anticipated for the 1946 field season. However, there is an urgent need for checking and disease survey work, especially on the White River area. No checking has been done since the last ribes eradication work and it is essential that a systematic checking sample be secured on areas worked the past two seasons in order to properly plan future ribes eradication activities. A disease survey, which could very well be combined with the checking work, is needed in order to assist in planning future work and to give a measure of the effectiveness of ribes eradication and canker elimination performed thus far. Every effort possible should be made to secure personnel for this checking and disease survey.

RESULTS

The following tables show statements of expenditures, results of the 1945 field work and accumulative results for all work done to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945 MOUNT RAINIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$ 747.33
National Park Service	Regular BLR-5	13,595.65
Total		\$14,342.98

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945 MOUNT RAINIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	\$618.23		\$ 618.23
Personal services		\$12,960.75	12,960.75
Travel and transp.	129.10	69.58	198.68
Contractual services		343.24	343.24
Supplies and material		222.08	222.08
Total	\$747.33	\$13,595.65	\$14,342.98

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes bracteosum	Ribes laxiflorum	Ribes acerifolium		Man-Days	Ribes
Longmire	Third	Pole	483	826	11,325	986	199	25,605	38,115	1.71	79
		Stream	542	374	2,604	3,431	1,959	313	8,307	.69	15
		Total	1,025	1,200	13,929	4,417	2,158	25,918	46,422	1.17	45

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1945
MOUNT RAINIER NATIONAL PARK

Working	Class	Gross Acres	Net Acres	Effective Man-Days	Total Ribes	Per Acre Basis	
						Man-Days	Ribes
First	NP-Reg.	2,647	1,838	3,806	780,171	1.44	295
	NP-CCC	5,607	1,743	6,264	860,336	1.12	153
	Total	8,254	3,581	10,070	1,640,507	1.22	199
Second	NP-Reg.	766	766	569	19,395	.74	25
	NP-CCC	3,561	2,774	5,372	381,518	1.51	107
	Total	4,327	3,540	5,941	400,913	1.37	93
Third	NP-Reg.	4,939	4,939	4,984	149,886	1.01	30
	NP-CCC	1,792	1,572	1,056	51,313	.59	29
	Total	6,731	6,511	6,040	201,199	.90	30
All Workings	NP-Reg.	8,352	7,543	9,359	949,452	1.12	114
	NP-CCC	10,960	6,089	12,692	1,293,167	1.16	118
	Total	19,312	13,632	22,051	2,242,619	1.14	116

TABLE 5

SUMMARY OF RIBES ERADICATION, 1930-1946
MOUNT RAINIER NATIONAL PARK
(Net Control Area)

Working	Area	Eradication Type	Acres	Man-Days	Ribes Destroyed								Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triste		Man-Days	Ribes
First	Longaire	Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192
		Stream	626	1,202	185,697		97,774		53,899	2,838	16		340,214	1.92	543
		Total	900	1,599	225,968		98,875		59,308	8,642	16		392,809	1.78	436
	White River	Reproduction	66	50	6,869	239	21	1,133	550	194			9,006	.76	136
		Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		Stream	423	744	162,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422
		Total	2,681	3,145	370,832	84,125	5,429	140,613	10,564	11,228	189	752	623,732	1.17	233
	All Areas	Reproduction	340	447	47,150	239	1,122	1,133	5,959	5,998			61,601	1.51	181
		Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		Stream	1,049	1,946	349,543	1,510	102,643	242	62,719	3,026	114	8	518,805	1.96	495
Second	Longaire	Reproduction	274	271	10,961		1,136			1,462			13,559	.99	49
		Stream	614	526	19,977		23,196		2,394	1,426	50		47,045	.96	77
		Total	888	797	30,938		24,332		2,394	2,888	50		60,602	.90	66
	White River	Reproduction	66	12	221			77					298	.18	5
		Pole	1,870	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.95	43
		Mature	322	47	1,278	2,011							3,289	.15	10
		Stream	394	657	32,748		154		5				32,907	1.67	84
		Total	2,652	2,484	70,531	16,315	2,330	6,941	16,229	4,537			116,883	.94	44
	All Areas	Reproduction	340	283	11,182		1,136	77		1,462			13,857	.85	41
		Pole	1,870	1,768	36,284	14,304	2,176	6,864	16,224	4,537			80,389	.95	43
		Mature	322	47	1,278	2,011							3,289	.15	10
		Stream	1,008	1,183	52,725		23,350		2,399	1,426	50		79,950	1.17	79
Third and Other	Longaire	Total	3,540	3,281	101,469	16,315	26,662	6,941	18,623	7,425	50		177,435	.93	50
		Pole	1,046	2,190	29,129		2,739		458	41,187	9		73,522	2.09	70
		Stream	1,336	1,564	43,916		16,264		3,388	864	6		64,438	1.17	48
	White River	Total	2,382	3,754	73,045		19,003		3,846	42,051	15		137,950	1.58	58
		Pole	3,274	1,456	1,650	3,196		12,822	20	5,184			22,872	.44	7
		Stream	855	407	15,440	2,268	227		703	4			18,642	.48	22
		Total	4,129	1,863	17,090	5,464	227	12,822	723	5,188			41,514	.45	10
	All Areas	Pole	4,320	3,646	30,779	3,196	2,739	12,822	478	46,371	9		96,594	.84	22
		Stream	2,191	1,971	59,366	2,268	16,491		4,091	868	6		63,080	.90	38
		Total	6,511	5,617	90,135	5,464	19,230	12,822	4,569	47,239	15		159,674	.86	28
All Workings	Longaire	Reproduction	548	668	51,242		2,237		5,409	7,266			66,154	1.22	121
		Pole	1,046	2,190	29,129		2,739		458	41,187	9		73,522	2.09	70
		Stream	2,576	3,292	249,580		137,234		59,681	5,128	72		451,695	1.28	175
		Total	4,170	6,150	329,951		142,210		65,548	53,581	81		592,371	1.47	142
	White River	Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70
		Pole	7,014	5,311	211,714	87,029	2,715	158,924	17,433	20,522	91	744	499,172	.76	71
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		Stream	1,672	1,808	211,044	3,778	5,250	242	9,528	192	98	8	230,140	1.08	138
		Total	9,462	7,492	458,453	105,904	7,986	160,376	27,516	20,953	169	752	782,189	.79	83
	All Areas	Reproduction	680	730	58,332	239	2,258	1,210	5,959	7,460			75,458	1.07	111
		Pole	8,060	7,501	240,843	87,029	5,454	158,924	17,891	61,709	100	744	572,696	.93	71
		Mature	644	311	28,605	14,858			5	45			43,513	.48	68
		Stream	4,245	5,100	460,624	3,778	142,484	242	69,809	5,320	170	8	681,835	1.20	161
		Total	13,632	13,642	788,404	105,904	150,198	160,376	93,064	74,536	270	752	1,373,305	1.00	101

BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1945

By

M. C. Riley, Operation Supervisor

The blister rust control program for the 1945 field season was a continuation of that initiated in 1939. Work was started on June 1, and continued until September 1 and consisted of second and third workings on the Park Headquarters area, second and third workings on the Lake McDonald area and first working on an extension of the original Lake McDonald area along Snyder Creek. The Park Headquarters area is located in unsurveyed secs. 25 and 26, T. 32 N., R. 19 W., Montana Meridian and the Lake McDonald work was in secs. 1, 2, 3, 10, 11, 12, 13, 14 and 23, T. 33 N., R. 18 W., Montana Meridian.

Work was conducted with one field crew of approximately twenty men from the Civilian Public Service camp and the performance of these assignees was satisfactory. An experienced foreman supervised the work. It was not possible to perform a systematic check on all of the worked area. Some strips were run on sample areas by a representative of the Bureau of Entomology and Plant Quarantine and this, coupled with random inspections, indicated that a good quality of work was done.

In July representatives of the Director's Office, the Regional Office, local Park Service officials and representatives of the Bureau of Entomology and Plant Quarantine visited the Snyder Creek area and decided to include this area in the Lake McDonald control unit. While it was not given any consideration when the original pre-eradication survey was made in Glacier National Park, there is a good stand of white pine of all age classes in association with other tree species. The trail to Sperry Glacier and Sperry Chalets passes through this area and it is one of the heavier visitor-use trails. This adjoins the original Lake McDonald unit and has now been made a part of it.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and organize the work. A representative also assisted in training the crew and getting the work started and later in the season did some checking work.

BLISTER RUST INFECTION

In previous seasons, blister rust has been found on the Lake McDonald and Two Medicine control units and on the Flathead River area which has never been considered in the general control area. During the past season blister rust infection was found on western white pine on the Park Headquarters control unit, on a small area along McDonald Creek approximately one-half mile above the mouth of Avalanche Creek, and on Fern Creek. The latter two locations are not in any control unit. Infection found on western white pine on the Park Headquarters area consisted of nine trees with one canker each. On the Lake McDonald unit a few additional cankers were found in the vicinity of the original infection. Very heavy infection exists on the McDonald Creek area and since this is immediately adjacent to the highway will serve as a good demonstration of damage to white pine when no control work is performed. Considerable infection was also located on the Fern Creek white pine. In both of these areas infection is so abundant that no control work is

contemplated. In all infection found thus far it is evident that initial infection occurred before any ribes eradication work was performed.

CONTROL STATUS

A complete regular check has not been performed on all of the areas worked during the past three years and this should be done as soon as possible so that the status of control on all areas can be definitely determined. However, sufficient sample checks and supervisory random inspections have been made to warrant rather general statements concerning all areas worked thus far. These may be subject to slight change on small patches of area when a check can be made.

Park Headquarters. First working was completed on this unit in 1939 and at present all necessary rework has been accomplished. Unless a check reveals resprouts in a few isolated areas such as in the vicinity of the Powder House, no additional work will be necessary on the upland area for at least five years. Practically all of the upland area can now be considered as being on a maintenance basis. Conditions along stream courses and in damp spots are considered as static at the present time except for a few small patches where Ribes lacustre seedlings may still be a problem. With the amount of infection now known to be present it is probable that none of this type of area will need working for about five years.

Two Medicine. The last work on this unit was performed in 1944. All initial work has been completed and rework has progressed according to schedule. Very light and widely scattered infection is known to exist here. A large portion of the upland is now on a maintenance basis. Exceptions are a comparatively small block of area on the rocky slope north of the campground, two small patches in the timber east of the campground and a small area at the southwest end of the protection zone. On all of the stream type, where heavy concentrations of ribes were previously removed, at least one more working will be required. Most of the lake shore is practically free of ribes now but a seedling problem exists in some of the stream type, especially in the vicinity of the east end of upper Two Medicine Lake. It is quite probable that two more workings will be necessary to place this portion of the stream type in a satisfactory condition.

Lake McDonald. First working was started on this area in 1939 and was completed in 1942 with the exception of the extension along Snyder Creek which was worked for the first time this season. Subsequent workings have been kept to schedule. The widely scattered infection appears to be very light. Very little future work will be necessary on upland types although some further work will be necessary in the northwest portion of the control unit and it is very probable that more work will be needed around the Lake McDonald Ranger Station and near the Lake McDonald Hotel where many service roads make openings in the timber stand. It is felt that no further work will be necessary in the upland types worked for the first time along Snyder Creek. While excellent work was done on Snyder Creek stream type this season, there was so much soil disturbance that undoubtedly further work will be needed here. This is also true of some stream type near the head of Lake McDonald,

especially the swamp area on the east side of the lake. Stream type along the remainder of the lake shore and along Sprague Creek appears to be in excellent condition.

East Glacier. Initial ribes eradication was started here in 1940 and was not completed until 1943, the next year in which any work was done on the area. Some second working was also done in 1943. While the work is behind schedule there is no known pine infection on this unit. Practically all of the upland type is approaching maintenance but some portions such as the cliff area west of the campground and along Roes Creek need further work. There is a definite seedling problem in some of the stream type which will probably require at least two more workings and all of the stream type will need one more working.

RECOMMENDATIONS

The following estimates are based upon ground conditions as they now exist according to the best knowledge, and naturally cannot take into consideration any ground disturbances such as those caused by fire, erosion, floods which change stream courses, road or trail construction and landscaping activities, all of which induce germination of ribes seed.

At Park Headquarters the work performed should suffice for a period of approximately five years when a crew of fifteen men for a period of one month should be able to do all work necessary in clearing up any bad spots revealed by a check and disease survey, which should be conducted in 1946. Probably another working will be needed at the end of another five years and it is estimated that this would require ten men for about a two week period.

The stream type along Snyder Creek on the Lake McDonald area will need another working in 1948 and other heavy stream type especially the swamp area near the head of Lake McDonald should also be covered. It is estimated that this would require the service of 15 men for one month. Portions of these same areas will need another working at the end of another three years and this would require 10 men for approximately one-half month. The last working for this unit would probably occur in about 10 years and would involve the services of 10 men for one-half month.

On the Two Medicine control unit 20 men will be needed for one month in 1947 to rework stream type and spots of upland where many ribes were removed in the previous work. Because of the seedling problem in the stream type it is felt that probably another working by 10 men for one month would be required in 1950. Then the area should be safe for another five years when final mop-up would again need 10 men for one month.

The East Glacier area is in about the same status. It is estimated that 20 men for two months in 1947, 10 men for one month in 1950 and 10 men for one month in 1955, would be necessary to remove the ribes from Roes Creek, the stream type along St. Mary Lake and the several cliff areas. There is a seedling problem on this unit which necessitates more workings than originally anticipated.

On all units where work has been done the problem is well under control. In spite of the light, scattered pine infection known to exist on some of the units, no trees are known to have been killed by blister rust thus far and it is reasonably certain that no appreciable loss will occur.

In the past few seasons there has been very little systematic checking work performed and disease survey work has not been adequate. To keep this work up to date in order to properly plan the attack and not cover area unnecessarily, two checkers should be employed in 1946. In future years one man for each year when ribes eradication is performed should be sufficient.

The above recommendations concern only those areas where ribes eradication work has already been done. It is proposed to initiate control work on the Oldman Lake unit in 1946 but until first working has been completed it is impractical to attempt estimates of the amount of future work necessary. In the light of information acquired and observations made regarding the susceptibility of the pine species present, and the width of protection strip necessary, the man-day estimates made in 1939 for the Oldman Lake area no longer apply. It is estimated that the equivalent of 30 men for two months, exclusive of camp building and training time, would be required for initial coverage of this area.

SUMMARY OF RECOMMENDATIONS AND ESTIMATES

Park Headquarters

1950 - 15 men for 1 month
1955 - 10 men for $\frac{1}{2}$ month

Lake McDonald

1948 - 15 men for 1 month
1951 - 10 men for $\frac{1}{2}$ month
1955 - 10 men for $\frac{1}{2}$ month

Two Medicine

1947 - 20 men for 1 month
1950 - 10 men for 1 month
1955 - 10 men for 1 month

East Glacier

1947 - 20 men for 2 months
1950 - 10 men for 1 month
1955 - 10 men for 1 month

Oldman Lake

1946 - 30 men for 2 months
1949 - rework

Checker

1946 - 2 men for season.

Thereafter one checker each year ribes eradication work is being done.

RESULTS

The following tables show statements of expenditures, results of the 1945 field work and accumulative results for all work performed to date.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945 GLACIER NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$1,116.15
National Park Service	Regular BLR-5	944.32
Total		\$2,060.47

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945 GLACIER NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	\$ 946.65	\$937.30	\$1,883.95
Travel and transp.	169.50		169.50
Supplies and material		7.02	7.02
Total	\$1,116.15	\$944.32	\$2,060.47

TABLE 3

SUMMARY OF RIBES ERADICATION, 1945
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species			Total Ribes	Per Acre Basis Man-Days	Ribes
					Ribes lacustre	Ribes viscosissimum	Ribes setosum			
Park Headquarters	Second	Reproduction	96	8	1		4	5	.08	
		Pole	223	23	11		31	42	.10	
		All Types	319	31	12		35	47	.10	
	Third	Reproduction	134	70	446	143	161	750	.52	6
		Pole	127	190	1,716	3,535	903	6,154	1.50	48
		All Types	261	260	2,162	3,678	1,064	6,904	1.00	26
	All Workings	Reproduction	230	78	447	143	165	755	.34	3
		Pole	350	213	1,727	3,535	934	6,196	.61	18
		All Types	580	291	2,174	3,678	1,099	6,951	.50	12
Lake McDonald	First	Mature	320	10	48			48	.03	
		Stream	36	239	16,727	1		16,728	6.64	465
		All Types	356	249	16,775	1		16,776	.70	47
	Second	Mature	902	317	7,878	88	1,494	9,460	.35	10
		Stream	2	48	2,128	7	30	2,165	24.00	1,063
		All Types	904	365	10,006	95	1,524	11,625	.40	13
	Third	Mature	342	205	4,682	126	1,375	6,183	.60	18
		Stream	1,564	532	12,608	214	2,869	15,691	.34	10
		All Types	38	287	18,855	8	30	18,893	7.55	497
All Areas	First	Mature	320	10	48			48	.03	
		Stream	36	239	16,727	1		16,728	6.64	465
		All Types	356	249	16,775	1		16,776	.70	47
	Second	Reproduction	96	8	1		4	5	.08	
		Pole	223	23	11		31	42	.10	
		All Types	319	31	12		35	47	.10	
	Third	Reproduction	134	70	446	143	161	750	.52	6
		Pole	127	190	1,716	3,535	903	6,154	1.50	48
		All Types	261	260	2,162	3,678	1,064	6,904	1.00	26
	All Workings	Reproduction	230	78	447	143	165	755	.34	3
		Pole	350	213	1,727	3,535	934	6,196	.61	18
		All Types	580	291	2,174	3,678	1,099	6,951	.50	12
	First	Mature	320	10	48			48	.03	
		Stream	36	239	16,727	1		16,728	6.64	465
		All Types	356	249	16,775	1		16,776	.70	47
	Second	Reproduction	96	8	1		4	5	.08	
		Pole	223	23	11		31	42	.10	
		All Types	319	31	12		35	47	.10	
	Third	Reproduction	134	70	446	143	161	750	.52	6
		Pole	127	190	1,716	3,535	903	6,154	1.50	48
		All Types	261	260	2,162	3,678	1,064	6,904	1.00	26
	All Workings	Reproduction	230	78	447	143	165	755	.34	3
		Pole	350	213	1,727	3,535	934	6,196	.61	18
		All Types	580	291	2,174	3,678	1,099	6,951	.50	12

TABLE 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1939-1945
GLACIER NATIONAL PARK

Working	Class	Acres	Effective Man-Days	Total Ribes	Per Acre Basis Man-Days	Ribes
First	NP-Reg.	262	301	37,155	1.15	142
	NP-COC	2,633	2,833	323,841	1.08	123
	NP-CPS	658	1,020	120,335	1.55	183
	Total	3,553	4,154	481,331	1.17	155
Second	NP-Reg.	731	763	122,606	1.04	169
	NP-CPS	1,471	684	57,016	.46	39
	Total	2,202	1,447	179,622	.66	82
Third	NP-CPS	647	581	36,805	.90	57
All Workings	NP-Reg.	993	1,064	159,761	1.07	161
	NP-COC	2,633	2,833	323,841	1.08	123
	NP-CPS	2,776	2,285	214,156	.82	77
	Total	6,402	6,182	697,758	.97	109

TABLE 5

SUMMARY OF RIBES ERADICATION, 1939-1945
GLACIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species				Total Ribes	Per Acre Basis	
					Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme		Man-Days	Ribes
Park Headquarters	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	284	122	13,428	15,364	8,967		37,759	.43	135
		Miscellaneous	39	119	9,411	21,340	8,353		39,104	3.05	1,005
		All Types	681	445	32,708	45,176	32,986		108,870	.65	155
	Second	Reproduction	230	47	2,877	581	562		4,020	.20	17
		Pole	350	102	327	964	566		1,917	.29	5
		Miscellaneous	39	52	13	975	67	2	1,065	1.33	27
		All Types	619	201	3,277	2,518	1,195	2	6,992	.52	11
	Third	Reproduction	134	70	446	143	161		750	.52	6
		Pole	127	190	1,716	3,535	903		6,154	1.50	48
		All Types	261	260	2,162	3,678	1,064		6,904	1.00	26
	All Workings	Reproduction	722	321	13,192	7,196	16,389		36,777	.44	51
		Pole	761	414	15,531	19,863	10,436		45,830	.54	60
		Miscellaneous	78	171	9,424	22,313	8,420		40,159	2.19	515
		All Types	1,561	906	32,147	49,372	35,245	2	122,766	.58	79
Two Medicine	First	Pole	593	645	40,145	2,703	1,723	8,646	53,219	1.05	90
		Miscellaneous	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
		Stream	54	480	30,429	458		12,592	43,459	9.99	905
		All Types	707	1,243	74,509	4,193	6,355	23,072	108,132	1.76	155
	Second	Pole	252	181	15,716	1,332	4,562	6,574	27,484	.72	109
		Miscellaneous	16	20	1,495	67		2,471	4,033	1.25	252
		Stream	32	156	46,233	14		25,259	71,506	4.88	2,235
		All Types	300	357	63,444	1,413	4,562	33,004	103,023	1.35	343
	Third	Stream	44	116	11,230	32		12,456	23,718	2.64	539
		Pole	845	826	55,861	4,037	6,285	14,520	80,703	.98	96
		Miscellaneous	76	138	5,430	1,117	4,665	4,305	15,517	1.82	204
		All Types	130	752	87,892	484		50,307	138,683	5.78	1,067
	All Workings	Pole	1,051	1,716	149,183	5,838	10,950	69,132	234,903	1.63	284
		Mature	1,730	923	21,125	4,253	34,175		59,553	.53	34
		Stream	47	278	21,911	36	1,602		23,549	5.91	501
		All Types	1,777	1,201	43,036	4,289	35,777		83,102	.68	47
Lake McDonald	First	Mature	1,730	923	21,125	4,253	34,175		59,553	.53	34
		Stream	47	278	21,911	36	1,602		23,549	5.91	501
		All Types	1,777	1,201	43,036	4,289	35,777		83,102	.68	47
	Second	Mature	1,184	620	11,051	1,393	17,490		29,934	.52	25
		Stream	13	69	3,126	137	1,324		4,587	5.31	353
		All Types	1,197	689	14,177	1,530	18,814		34,521	.56	29
	Third	Mature	342	205	4,682	126	1,375		6,183	.60	18
		Stream	3,256	1,748	36,858	5,772	53,040		95,670	.54	29
		All Types	60	347	25,037	173	2,926		28,136	5.78	469
	All Workings	Pole	3,316	2,095	61,895	5,945	55,966		123,806	.63	37
East Glacier	First	Pole	367	1,005	44,305	14,739	11,042	65,936	136,022	2.74	371
		Stream	21	260	71	158		44,946	45,175	12.38	2,151
		All Types	388	1,265	44,376	14,897	11,042	110,882	181,197	3.26	467
	Second	Pole	86	200	21,816	2,492	9,507	1,271	35,086	2.33	408
		Stream	453	1,205	66,121	17,231	20,549	67,207	171,108	2.68	378
		All Types	21	260	71	158		44,946	45,175	12.38	2,151
	All Workings	Pole	474	1,465	66,192	17,389	20,549	112,153	216,283	3.16	456
All Areas	First	Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
		Pole	1,244	1,772	97,878	32,908	21,732	74,562	227,000	1.42	182
		Mature	1,730	923	21,125	4,253	34,175		59,553	.53	34
		Miscellaneous	99	237	13,346	22,390	13,018	1,834	50,588	2.39	511
	Second	Stream	122	1,015	52,411	632	1,602	57,588	112,183	8.34	920
		All Types	3,553	4,154	194,689	66,555	86,193	133,954	481,351	1.17	135
	Third	Reproduction	230	47	2,877	581	562		4,020	.20	17
		Pole	688	493	37,919	4,788	14,635	7,145	64,497	.70	94
		Mature	1,184	620	11,051	1,393	17,490		29,934	.52	25
		Miscellaneous	55	72	1,508	1,040	67	2	473,088	1.31	93
	All Workings	Stream	45	225	49,352	151	1,324	25,229	76,093	5.00	1,691
		All Types	2,802	1,447	102,714	7,953	34,078	34,877	179,622	.66	82
	Third	Reproduction	134	70	446	143	161		750	.52	6
		Pole	127	190	1,716	3,535	903		6,154	1.50	48
		Mature	342	205	4,682	126	1,375		6,183	.60	18
		Stream	44	116	11,230	32		12,456	23,718	2.64	539
	All Workings	All Types	647	581	18,074	3,836	2,439	12,456	36,805	.90	57
		Reproduction	722	321	13,192	7,196	16,389		36,777	.44	51
		Pole	2,059	2,445	137,513	41,131	37,270	81,727	297,641	1.19	145
		Mature	3,256	1,748	36,858	5,772	53,040		95,670	.54	29
	All Workings	Miscellaneous	154	309	14,854	23,430	13,085	4,307	55,676	2.01	362
		Stream	211	1,359	113,000	815	2,926	95,253	211,994	6.44	1,005
		All Types	6,402	6,182	315,417	78,544	122,710	181,287	697,758	.97	109

BLISTER RUST CONTROL, YELLOWSTONE NATIONAL PARK, 1945

By

M. C. Riley, Operation Supervisor

C. M. Chapman, Pathologist

Following the finding of blister rust infection on Ribes petiolare at Clematis Gulch in the Mammoth control unit during the fall of 1944, ribes eradication for the control of white pine blister rust was initiated in Yellowstone National Park during the field season of 1945. Work started on June 18 and ended on September 14. The field crew consisted of a maximum of 20 men assigned to the Yellowstone side camp from the Civilian Public Service camp at Glacier National Park.

First working was performed on the Mammoth unit and this involved hand eradication, chemical spraying of R. petiolare in stream type using ammonium sulfate in solution and the chemical treatment of decapitated bushes which were rock-bound. Initial working was completed on the pine area itself but there still remains some spraying work to be done in the protection zone. This could have been completed and additional needed mop-up could have been performed if the crew had spent the entire field season on ribes eradication. However, because of time spent on fire in Glacier National Park and time spent on construction of the Purple Mountain trail, the programmed work was not completed.

Some special problems were encountered which added somewhat to the man-day cost. Great care had to be exercised, in working around buildings and landscaped areas in order not to disturb or destroy other vegetation than ribes. This decreased normal man-day output in both hand and chemical work. In working around the administrative area it was necessary to dispose of pulled bushes and string lines.

All worked area was given a systematic 4 percent check except the stream type on Glen Creek and a small patch of upland area at the south end of the protection zone. This unchecked area was worked at the end of the season and time did not permit making the check. In general, satisfactory work was done. Some small patches of area have too many ribes remaining, especially on the south side of the control unit and in and adjacent to the crater holes. Some portions of the area where heavy concentrations of ribes were removed will undoubtedly produce many seedlings and will need reworking at some future date.

No experienced blister rust foreman was available and prior to the securing of an additional foreman only mediocre supervision was supplied. This, plus a decided lack of interest on the part of a majority of the Civilian Public Service assignees, made it necessary to perform more mop-up than is usually necessary.

No blister rust infection has been found on the white pine in Yellowstone National Park although considerable time was spent in examining the pine on the Mammoth control unit this past season. Additional blister rust infection was found on R. petiolare in Clematis Gulch and new ribes infection locations on R. petiolare and R. setosum were discovered on Glen Creek above the old road

crossing. The determination was made by the Division of Forest Pathology, U. S. Department of Agriculture.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and organize the work and assisted in training the crew. A representative of the Bureau, who remained on the work for practically the duration of the project, gave technical assistance in locating boundaries, checking the work and scouting for white pine blister rust infection. Funds from a regular National Park Service appropriation were used to employ foremen and to cover expenditures for supplies and equipment.

RECOMMENDATIONS

The remaining first working on the Mammoth control unit should be completed in 1946. This can readily be done in conjunction with, and as a forerunner to, the proposed ribes eradication work on the Mt. Washburn control unit. It is anticipated that many ribes seedlings will appear on the parts of the area where heavy ribes concentrations were removed, but definite recommendations as to where additional work would be feasible should be deferred until more opportunity is afforded to appraise the amount of rework necessary.

It has been recommended that ribes eradication be initiated on the Mt. Washburn unit in 1946 if funds are available. Because of the hazardous nature of some of the terrain and the probable scarcity of adequate supervisory personnel it is felt that a crew of 30 men in the field is all that should be used. With this size crew it will probably require two field seasons to accomplish initial working because of difficult working conditions, a comparatively short working season due to late snows, and the fact that it is advisable to extend the protection zone beyond that originally contemplated.

RESULTS

The following tables show statements of expenditures and results of the 1945 field work.

TABLE 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1945 YELLOWSTONE NATIONAL PARK

Cooperating Agency	Appropriation	Amount
Bureau of Entomology and Plant Quarantine	Regular BLR-1-4	\$1,640.70
National Park Service	Regular BLR-5	5,718.93
Total		\$7,359.63

TABLE 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1945
YELLOWSTONE NATIONAL PARK

Item	Bureau of Entomology and Plant Quarantine	National Park Service	Total
	Regular BLR-1-4	Regular BLR-5	
Sal. perm. men	\$1,255.03		\$1,255.03
Personal services		\$1,548.97	1,548.97
Travel & transp.	385.67	854.41	1,240.08
Transp. of things		14.09	14.09
Supplies & materials		3,209.25	3,209.25
Equipment		92.21	92.21
Total	\$1,640.70	\$5,718.93	\$7,359.63

TABLE 3
SUMMARY OF RIBES ERADICATION, 1945
YELLOWSTONE NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man-Days	Ribes by Species					Total Ribes	Gallons Spray	Per Acre Basis		
					Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes setosum	Ribes cereum			Man-Days	Ribes	Gallons
Mammoth	First	Mature	1,562	913	4,132	2,329		62,720	12,211	81,392		.56	52	
		Stream	5	79	4,190	2	9,900	281	4	14,377	765	15.80	2,875	153
		All Types	1,567	992	8,322	2,331	9,900	63,001	12,215	95,769		.63	61	

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION, AND PROGRESS OF RIBES
ECOLOGY AND DISEASE CONTROL STUDIES IN THE NORTHWESTERN REGION FOR 1945

By
V. D. Moss, Forest Ecologist, H. K. Offord, Pathologist,
and C. R. Stillinger, Pathologist

FOREWORD

Activities of the developmental and improvement project BLR-1-6 for the calendar year of 1945 have included office, laboratory, greenhouse and field work. The present annual report, as in past years, is primarily devoted to a discussion on field work. Only a brief statement (Section III) is given of activities other than field work. Section II presents details of the plot data secured during 1945. Section I is a status report on the various field studies in methods of ribes eradication, ribes ecology, and disease control investigations currently in progress. Attention is called to the recommendations for chemical eradication of ribes in Table 7 of the report in Section II on improvement of chemical methods for ribes eradication. Of special interest is the recommendation of Dow Endowed (2,4-dichlorophenoxyacetic acid) for chemical spray treatment of *Ribes petiolare*. In the detailed report on the ecology of ribes occurring in Section II, results of first inspection for ribes seed germination from the disturbance plots are given. This study is providing valuable information in the length of time ribes seed will remain viable following alteration of the seed storage environment by removal of part or all the timber canopy in logging. The report on disease control studies includes an index on conditions for pine infection in 1945, and a summary report of the pruning and inspection work undertaken on the Powder House plot during the current season. A special report on the Powder House plot will be issued early in 1946.

I. SUMMARY

A. Tests of Ammonium Sulfamate and 2,4-Dichlorophenoxyacetic Acid for Ribes Eradication

1. Status of work. Field tests of ammonium sulfamate applied in 1943 and 1944 were inspected for effectiveness of kill in 1945. From the results, recommended dosages were established for practical field applications beginning with the current season.

A new herbicide, 2,4-dichlorophenoxyacetic acid, was tested in the field for the first time in 1945. This chemical is a plant growth hormone type of weed killer of high ecologic and plant species selectivity. Field tests in Idaho were made on *Ribes viscosissimum* and upland-type *R. lacustre* at the source of LaClerc Creek, Kaniksu Forest, and on *R. petiolare* and *R. inerme* along the St. Maries River near Fernwood, Idaho. In Wyoming, field tests were made on *R. montigenum*.

Results to date have shown *R. petiolare* to be the only species of ribes definitely susceptible to the new chemical. *Ribes lacustre* and *R. montigenum* are definitely not susceptible. *Ribes inerme* and *R. viscosissimum* are in the doubtful category and the results of examinations next spring

must be awaited before preliminary conclusions can be drawn. Investigations are in progress this winter at Berkeley to modify the 2,4-D spray or to develop other chemicals of similar properties in order to obtain low cost herbicides that will be effective on all ribes.

B. Grazing of Sheep on Cut-over Lands in Relation to the Regeneration and Growth of Ribes and Western White Pine

1. Status of Work. Four studies are in progress on problems relating to grazing of sheep and control of the rust on cut-over lands in the white pine type, namely: (a) Effects of normal grazing of recent cut-over lands on the germination, growth and development of ribes and western white pine seedlings, (b) Effects of deferred grazing on . . . seedlings, (c) Effects of controlled grazing on . . . seedlings, and (d) Effects of continuous seasonal grazing of old logged and burned-over lands on the regeneration of ribes and western white pine seedlings.

With the curtailment of research activities during the war period, it was necessary to defer considerable work on these studies in preference to concentrating on problems of cutting practices. Except for maintenance of the fenced exclosures and of the grazing schedules and inspection for new ribes and pine germination, no further work was undertaken this season. A five-year study program, the original objective, was completed in 1944 with removal of all ribes from the plots. There remain as objectives in the continuation of these grazing studies: observations on new ribes germination, survival, development and new germination of white pine seedlings, similar data for associated coniferous species, and the comparative conditions of grazed and ungrazed areas as related to the problem of travel and search in ribes eradication.

Since complete examinations of the grazing plots were not made this season, no discussions are presented in the section on field work. However, a brief resume of important conclusions is presented in this summary section for each grazing study.

(a) The effects of normal grazing by sheep of recent cut-over lands on the germination, growth and development of ribes and western white pine seedlings have shown the following facts of importance to the rust control operations.

- (1) Dwarfed or stunted ribes are not a result of grazing except along driveways and on bedding grounds where overgrazing is a common practice.

- (2) Grazing of recent cut-over lands does not add to the problem of new ribes germination but actually decreases their numbers.

- (3) Searching for ribes is made less difficult on areas subjected to grazing, providing eradication work precedes grazing in any one year.

(4) Germination of white pine seed is materially increased on areas subjected to the grazing disturbance with practically no loss of seedlings on slopes under 40 percent grade.

(b) The deferment of grazing from older cut-over lands until satisfactory control standards can be established generally showed results unfavorable to effective control work.

(1) All subdominant vegetation responded in density and height-
growth, making difficult the searching for ribes in a compact cover.

(2) Growth of ribes was in proportion to growth of other plant associates.

(3) Rodent activity increased and was responsible for new ribes germination on areas deferred from grazing.

(4) The number of new white pine seedlings was considerably less on deferred areas.

(c) Controlling the intensity of grazing by construction of enclosures made possible comparisons of intensities of grazing.

(1) Moderate grazing at the rate of 21 acres per animal unit had no appreciable influence on ribes or white pine seedlings.

(2) On slopes greater than 40 percent in grade grazing at the rate of 14 acres per animal unit resulted in ribes seed germination and rather severe loss of white pine seedlings.

(d) Continuous seasonal grazing of old logged and burned-over lands has for the most part favored ribes eradication.

(1) Brush cover has remained more open, a material aid in travel and search for ribes.

(2) New ribes germination has been at a minimum because of heavy sodding.

(3) White pine seedlings have continued to germinate and become established in spite of the sod.

G. Ecological Studies of Ribes and Western White Pine

1. Status of work. Investigations were continued the past season on the following problems: a. The effects of variable light and moisture conditions on the germination, growth and development of *R. viscosissimum*, *R. lacustre* and *Pinus monticola*. b. Longevity of ribes seeds as affected by alteration of the storage environment resulting from cutting of mature timber. c. Slash disposal measures and their influence upon the regeneration and development of ribes and white pine

seedlings. d. Stand improvement practices in relation to the ecological development of ribes. e. The predetermination of potential ribes populations in stands of mature timber as a factor in forest management practices. f. Direct seeding of conditioned white pine seed.

(a) The study of variable light and moisture conditions on germination, growth and development of upland ribes and white pine seedlings was established under light intensities of full sun, half shade, and full shade environments. At each light station seeds of ribes and white pine were sown on natural duff, mineral and burnt-mineral soil surfaces. Continuous observations over a period of 5 years have shown, in addition to facts previously reported in the 1941 to 1944 annual reports, the following conclusions:

(1) Longevity of ribes seeds is dependent upon soil moisture-soil temperature relationships in the seed-storage environment. Highly significant is the fact that a drastic alteration of the seed-storage environment as through cutting of timber results in devitalization of ribes seeds. The cut must be so regulated as to produce the desired environmental change in the organic mantle, and yet maintain sufficient canopy shade to suppress the majority of ribes seedlings originating as a result of the disturbance.

(2) Through a gradual sifting process, resulting from the action of water, wind, and animal activity, ribes seeds soon become too deeply buried in the soil medium for germination. Unless favorable soil temperature-soil moisture conditions prevail ribes seeds within the storage environment soon lose viability and are no longer a factor in the problem of new germination.

(b) Longevity of ribes seeds is dependent upon the favorableness of the seed-storage environment. This infers a relative constant environment of low soil temperature, soil moist at all times, and no appreciable exchange of soil gases. When one or more of these conditions are altered, the resultant effect upon ribes seeds is either germination or a reduction in viability. It is the purpose of this study to determine how the longevity of ribes seed is related to the time factor (number of years succeeding a disturbance) and to an alteration of the seed-storage environment. Interest primarily centers around the question whether stored ribes seed undisturbed mechanically by logging will continue to represent a potential population upon some later disturbance. If data continue to be as encouraging as those recorded this season from the five disturbance plots, a considerable reduction in ribes populations through devitalization of stored seed should be possible by regulating the intensity and number of cuts in stands of merchantable size.

(c) Studies of slash disposal measures were continued in cooperation with the Forest Service, Potlatch Forests, Inc., and the Slash Disposal Committee of the Inland Empire Section, Society of American Foresters. Few actual plot inspections were possible under the curtailed program. Those examined gave positive proof that partial

disposal measures materially aid in the reduction of ribes regeneration on newly cut-over lands. Besides the reduction in numbers of ribes, their distribution is limited to roadways, skid trails, and fire breaks.

(d) Ribes ecological studies relating to stand improvement practices in the western white pine type were currently continued in cooperation with Timber Management and the Northern Rocky Mountain Forest and Range Experiment Station, Forest Service. Considerable emphasis was placed this past season on evaluation of potential ribes problems in relation to cutting practices. Three major blocks of mature timber were carefully studied in view of potential ribes, mountain pine beetle, and silvicultural aspects. These units were the Lost Block and Steamboat areas on the Coeur d'Alene National Forest, and the Sheep Mountain sale on the Clearwater National Forest. Many other areas were inspected either for the purpose of agreeing upon cutting practices or in connection with timber management inspection trips.

(e) Ribes control problems currently arise from the vast acreage of mature timber cuttings. The degree to which these problems are made difficult is dependent upon forest practice methods. Forest practice methods must proceed judiciously, for management can no longer disregard the problems of rust control and expect sound silvicultural objectives to be realized. As cutting operations are responsible for new ribes populations, it is management's responsibility to adopt sound forestry methods resulting in the least possible control problem. The solution is at hand if the silvicultural objective is white pine of an equal or greater proportion than the stand harvested. The answer is the adaptation of forest practices based on the silvicultural and economic aspects of a stand with minimum disposal of slash. When this is done the problem of blister rust control will be decidedly reduced to a minimum.

In order for timber management to take advantage of ribes-free and light ribes potentials on areas in regulating the degree of cut, it is necessary to predetermine potential ribes populations before cutting practices are agreed upon. It is the purpose of this study to evaluate and systematize procedures for this work. The method incorporates six divisions of information, namely:

1. Inspection for ribes, established or newly germinated in openings, moist sites, along game trails, rodent mounds, etc.
2. Fire history of area (single or multiple) in relation to exposures.
3. Ecology of stand, origin, composition, age, etc.
4. Subdominant vegetation, compatibility of brushy and herbaceous plants with ribes.

5. Edaphics of soil profile in respect to favorableness of seed-storage environment.
6. Screening and recovery of ribes seeds on a unit basis of area.

Step 6 is primarily employed for the determination of seed viability.

(f) Direct seeding activities were temporarily curtailed for lack of a 1944 seed crop. This season (1945) adequate seed was obtained for an extensive study next spring. Process for conditioning seed has been worked out and principles of a seed-cracker critically tested. The mechanism will be constructed this winter. Spot and broadcast sowings will be made on the Diamond Creek burn, Kaniksu Forest early next spring.

D. Disease Control Plot Studies

1. Status of work. During the past season, as in previous years, blister rust disease behavior on ribes was observed in relation to the probable infection of western white pine throughout the region. Routine maintenance work was conducted on existing plot studies with some new work inaugurated. One new study was a disease survey undertaken to determine the amount of pine infection bordering the Powder House plot on the Clearwater National Forest in comparison to the average amount of pine infection within the plot. The majority of the season's work was devoted to the establishment of a pruning study of white pine on the Powder House plot. The purpose of this study is to determine the practicability of salvaging blister rust infected white pine stands through pruning procedures.

An inspection of permanent blister rust plots in northern Idaho showed the development of the rust on ribes to be comparable to the 1944 season. It was also observed that the intensification of the rust on ribes increased toward the southern portion of the region. During the dates between September 15 to 17 and September 20 to 26 conditions for pine infection were favorable since both periods were relatively cool and moist. Seasonal examinations of pine have shown but little if any infection occurring since 1941. The disease survey of pine bordering the Powder House plot showed a slightly high average percentage of infection than on the plot itself. The report of the Bureau-Forest Service cooperative study of pruning is principally devoted to a discussion of methods and problems encountered. This study will be made the subject of a special report in the future.

II. FIELD WORK

IMPROVEMENT OF CHEMICAL METHODS FOR RIBES ERADICATION

Results of 1944 Tests

Ammonium sulfamate in the form of Dupont's Ammate (80% by weight of ammonium sulfamate, $\text{NH}_4\text{SO}_3\text{NH}_2$) was the only chemical tested in the field during 1944.

Plots on stream type Ribes lacustre at Crystal Creek, St. Joe National Forest, and LaClere Creek, Kaniksu National Forest, were observed several times during the season of 1945 and were given a final check in September 1945. Results of this check, as shown in Tables 1 and 2, confirm the previous results (1944 annual report) regarding the effectiveness of sulfamate in killing stream-type R. lacustre. Data also show that spring and fall applications of sulfamate on R. lacustre tend to be more effective than midseason applications. Some seedlings of 1945 origin were found on the Crystal Creek plots (see column 6 of Table 1), thus indicating that the sulfamate has only a temporary poisoning action on the soil especially in alluvial stream bottom where considerable leaching and washing may occur over winter and spring months.

The plots at LaClere Creek were primarily R. viscosissimum plots. Results on the upland R. lacustre are incidental to the experimental design of the plots because of small numbers of bushes and unequal distribution among the several dosages. Ribes viscosissimum can apparently be killed by sulfamate, but the lethal dosage of the chemical is greater than for stream-type R. lacustre. Also the spring applications on R. viscosissimum resulted in generally better kill than the fall applications.

Results of the semipractical spray test of sulfamate on large rockbound R. lacustre (and R. viscosissimum) were encouraging. These bushes (located above the road in the first draw on the Idaho side of LaClere Creek) were large, multiple-rooted, and would have been costly and troublesome to eradicate by grubbing. Only two feeble sprouts were found among the nine clumps of R. lacustre and R. viscosissimum when the bushes were checked this year. Treatment was by Ammate (1 lb. per gallon) applied at the dosage rate of about 2 lbs. per milacre.

TABLE 1

RESULTS OF 1944 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE
ON RIBES LACUSTRE, CRYSTAL CREEK, ST. JOE NATIONAL FOREST, IDAHO

Plot No.	Per Milacre				No. of Surviving Bushes ^{6/}	Percent Kill of Live Stem ^{7/}
	Percent of Plot Occupied by Ribes	Feet of Live Stem	Lbs. of Chemical	Gals. of Water		
Spring series ^{1/}						
7	30	350	2	2	0	100
8	20	200	1	2	0	100
9	60	600	3	3	0	100
10	40	600	4	4	0	100
11	20	200	1/2	1	2	99 (3)
12	50	500	6	6	0	100
Summer series ^{2/}						
13	75	1,050	1/2	1	1 (1)	99 (8)
14	55	875	1	2	0 (8)	100
15	40	650	2	2	0 (5)	100
16	60	950	3	3	0 (1)	100
17	40	575	4	4	2	98 (9)
18	60	700	6	6	0 (1)	100
Fall series ^{3/}						
19	40	450	6	6	0 (3)	100
20	30	325	2	2	0	100
21	40	350	3	3	0	100
22	25	250	1	2	0	100
23 ^{4/}	15	175	1/2	1	3	92 (12)
24 ^{5/}	40	400	4	4	0	100

1/ Applied June 10; 2/ applied July 18; 3/ applied September 5.

4/ Also R. petiolare (60 FLS). 99% live stem kill (1 surviving plant).

5/ Also R. petiolare (25 FLS). All plants dead in 1945.

6/ Numbers in parenthesis show number of R. lacustre seedlings of 1945 origin.

7/ Numbers in parenthesis show surviving live stem (FLS).

TABLE 2

RESULTS OF 1944 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE
ON RIBES VISCOSISSIMUM AND UPLAND R. LACUSTRE,
LACLERC DRAINAGE, KANIKSU NATIONAL FOREST, IDAHO

Plot No.	Per Milacre				Percent Kill	
	No. of Bushes	Feet of Live Stem	Lbs. of Chemical	Gals. of Water	Bushes ^{3/}	Live Stem ^{4/}
Spring series ^{1/}						
1	29 V. 1 L.	232 8	4	4	100 100	100 100
2	37 V. 1 L.	240 4	2	2	97 (1) 100	99 (2) 100
3	43 V. 1 L.	250 7	1	1	98 (1) 100	99 (1) 100
4	34 V. 2 L.	272 40	1/2	1	82 (6) 0 (2)	97 (7) 75 (10)
Fall series ^{2/}						
5	26 V. 1 L.	425 25	4	4	77 (6) 100	96 (17) 100
6	14 V. 17 L.	125 225	3	3	64 (5) 94 (1)	84 (20) 99 (1)
7	18 V.	275	6	6	100	100

^{1/} Applied June 14; ^{2/} applied September 9.

^{3/} Numbers in parenthesis show number of surviving bushes.

^{4/} Numbers in parenthesis show surviving live stem in feet.

New Herbicides Tested in 1945

The plant growth hormone type of weed killer was tested on ribes in the field for the first time in 1945. 2,4-dichlorophenoxyacetic acid was the only hormone available in commercial quantity, and field tests were confined to this chemical in one or other of its soluble forms. The acid is relatively insoluble in water and must be converted to a soluble salt by adding dilute alkali or carbonate or by forming the soap or ester with other organics such as polyethylene glycol (Carbowax) or triethanolamine. Data given in Tables 3, 4, 5, and 6 summarize the field tests made with 2,4-D on R. lacustre, R. inerme, R. petiolare, R. viscosissimum, and R. montigenum.

The unusual properties of 2,4-D and related compounds and the variables to be considered in evaluating them for ribes eradication will be presented in a special report at a later date. For the present it is sufficient to point out that the high selectivity of 2,4-D has been confirmed by tests on ribes. Ribes petiolare is definitely susceptible. Ribes lacustre and R. montigenum are definitely not susceptible. Ribes inerme and R. viscosissimum are in the doubtful category and the results of next spring must be awaited before preliminary conclusions can be drawn. Investigations are now in progress to modify the 2,4-D spray or to develop other chemicals of similar properties in order to obtain herbicides that will be effective on all ribes.

TABLE 3

1945 SPRAY AND SOIL DRENCH TESTS OF 2,4-D ON R. VISCOSSISSIMUM AND
UPLAND R. LACUSTRE, LACLERC CREEK PLOTS,
KANIKSU NATIONAL FOREST, IDAHO

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. Solution	No. of Bushes	Feet Live Stem	Percent Ground Occupied by Ribes
6/14 9	2,4-D 70% Dow Na Salt 1.43 oz. in 10 gals. water plus Tergitol #7 ^{1/}	4	8 V. 1 L.	200 20	35
10		3	34 V. 12 L.	200 30	50
11		1	9 V. 7 L.	90 110	35
12		2	21 V. 2 L.	250 5	40
13	2,4-D 60% Dow Na Salt 1.67 oz. in 10 gals. water plus dilute NH ₄ OH to dis- solve residue plus Tergitol #7	3	13 V. 5 L.	125 30	30
14		4	14 V. 12 L.	115 140	40
15		2	25 V. 4 L.	150 60	25
16		1	21 V.	250	35
8/10 17	2,4-D 70% Dow Na Salt 1.43 oz. in 5 gals. water plus Tergitol #7	3	30 V. 11 L.	120 50	40
18		2	32 V. 2 L.	175 15	45
19	2,4-D 100% acid in 1% Carbo- wax	4	33 V.	180	30
20	1.0 oz. in 10 gals. water plus Tergitol #7	1	24 V. 2 L.	100 10	20
21		3	29 V. 1 L.	200 10	25
22		2	23 V.	230	30
9/10 23	2,4-D 60% Dow Na Salt 1.67 oz. in 6 gals. water plus rufural (4 tablesp.) plus Tergitol	1	28 V.	300	40
24		2	24 V.	270	40
25		3	31 V. 1 L.	300 5	50
25a		2 ^{2/}	36 V.	200	30

^{1/} In this and in all other tests Tergitol was used at the rate of about 1 tablespoonful for each 10 gallons of solution.

^{2/} Same chemicals used but 1/4 strength.

TABLE 4

1945 SPRAY AND SOIL DRENCH TESTS OF 2,4-D ON *R. LACUSTRE*,
LACLERC CREEK PLOTS, KANIKSU NATIONAL FOREST, IDAHO

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. Solution	No. of Bushes	Feet Live Stem	Percent Ground Occupied by Ribes
6/13 1	2,4-D 100% acid in 1% Carbowax	2	9	450	75
2	1.0 oz. in 10 gals. water	3	8	450	75
3	plus Tergitol #7	1	15	400	85
4 ^a			6	125	50
4 ^b		4	5	175	60
6/15 5	2,4-D 70% Dow Na Salt	1	4	350	50
6	1.43 oz. in 10 gals. water	3	4	600	80
7	plus Tergitol #7	4	4	700	85
8		2	7	700	30
8/9 17a	2,4-D 100% acid in 1% Carbowax	1	9	450	85
18a	1.0 oz. in 10 gals. water	2	7	400	30
19a	plus Tergitol #7	4	5	500	90
20a ^{1/}		3	4	400	90
21a	2,4-D 70% Dow Na Salt	3	5	700	95
22a	1.43 oz. in 5 gals. water	2	6	600	85
	plus Tergitol #7				
9/10 26	2,4-D 60% Dow Na Salt	2 ^{2/}	6	350	35
27	1.67 oz. in 6 gals. water	3	5	500	80
28	plus furfural (4 tablespoons)	2	14	450	70
	plus Tergitol #7				

^{1/} On this plot there were also 2 *R. viscosissimum* having 150 F.L.S.

^{2/} Same chemicals used but 1/4 strength.

TABLE 5

1945 SPRAY AND SOIL DRENCH TESTS OF 2,4-D ON R. PETIOLARE AND R. INERME,
 FERNWOOD BRIDGE PLOTS, ST. JOE NATIONAL FOREST, IDAHO

Plot No. and Date Treated	Composition and Concentration of 2,4-D Solution	Per Milacre			
		Gals. Solution	No. of Bushes	Feet Live Stem	Percent Ground Occupied By Ribes
6/22 1	2,4-D 70% Dow Na Salt		9 P.	300	
2	1.43 oz. in 10 gals. water	4	2 I.	25	90
3	plus Tergitol #7	1	12 P.	300	80
4		3	4 P.	60	
5		2	5 I.	50	20
6		2	10 P.	200	40
7	2,4-D 60% Dow Na Salt	2	12 P.	250	50
8	1.67 oz. in 10 gals. water	1	14 P.	300	70
	plus dilute NH ₄ OH to dissolve	4	5 P.	275	75
	residue, plus Tergitol #7	3	6 P.	350	90
8/3 9	2,4-D 100% acid in 1% Carbowax	2	8 P.	250	40
10	1.0 oz. in 10 gals. water	1	9 P.	350	65
11	plus Tergitol #7	4	10 P.	300	50
15		3	6 I.	150	30
12	2,4-D 70% Dow Na Salt	1	8 P.	250	40
13	1.43 oz. in 10 gals. water	4	9 P.	200	30
14	plus Tergitol #7	2	10 P.	350	60
16		3	8 I.	175	40
9/12 17	2,4-D 60% Dow Na Salt	2 1/4	10 P.	250	70
18	1.67 oz. in 6 gals. water	2	8 P.	300	80
19	plus Tergitol #7	3	8 P.	275	80
20	2,4-D 60% Dow Na Salt	1	4 I.	175	40
21	1.67 oz. in 6 gals. water	2	10 I.	150	30
22	plus furfural (4 tablespoons)	3	7 I.	150	30
	plus Tergitol #7				

1/ Same chemicals but 1/4 strength.

TABLE 6

1945 SPRAY AND SOIL DRENCH TESTS OF AMMONIUM SULFAMATE AND 2,4-D CHEMICALS ON R. MONTIGENUM, MT. WASHBURN, YELLOWSTONE NATIONAL PARK, WYOMING

Plot No. and Date Treated	Chemical Composition and Concentration of Solution	Square Footage of Area Treated	Gals. of Solution
8/23 1	Ammonium sulfamate (DuPont's Ammate), 10 lbs. in 10 gals. of water plus Tergitol #7 (1 tablespoon).	25	1/
2		4	
3		48	
4		48	10
5		12	gals.
6		144	total
7		4	
8		8	
9		64	
7/25 1	2,4-D, 70% Dow Na Salt 1.43 oz. in 10 gals. of water plus Tergitol #7 (1 tablespoon)	43.56	1
2		43.56	2
3		43.56	3
4		43.56	4
9/1 5	2,4-D, 70% Dow Na Salt 1.43 oz. in 10 gals. of water plus Tergitol #7 (1 tablespoon)	43.56	1
6		43.56	2
7		43.56	3
8		43.56	4

1/ 10 gallons of solution was applied to individual clumps of R. montigenum representing a total combined area of 357 square feet of growing space.

STATUS OF RECOMMENDATIONS FOR THE CHEMICAL ERADICATION OF RIBES

Recent developments and testing of new chemicals for use in ribes eradication have reached the point where recommendations can be made for practical spray work. The new chemicals should be tested in operations work by limited use under the several ecologic and soil conditions encountered throughout the region. The principal objectives of setting down these recommendations is to acquaint all blister rust supervisors with the established facts relating to the effectiveness of the new herbicides so that proper consideration can be given to them in planning the eradication work for the 1946 field season. Ammonium sulfamate and 2,4-D appear to have advantages in cost, effectiveness or bulk over Atlacide (Chlorates) for regular spray work in the following situations

(1) Ammonium sulfamate (DuPont Ammate) for work on a single species of Ribes lacustre, R. inerme, or R. viscosissimum, or any combination of these three with R. petiolare where it is impractical to spray R. petiolare in a special operation. This recommendation applies either to initial or rework with the usual reservations about number of bushes and availability of water.

(2) 2,4-D (Dow sodium salt 60%, called Endowed) for work on R. petiolare either initial or rework where it occurs as a single species.

Status of recommendations of dosage and treatment is summarized in Table 7.

TABLE 7

RECOMMENDATIONS ON THE USE OF NEW HERBICIDES FOR PRACTICAL RIBES ERADICATION WORK
IN THE NORTHWESTERN REGION^{1/}

(Summarizes best information available through the fall of 1945)

Common Name of Chemical	Grade or Type to be Purchased for Field Use	Ribes Species	Dosage per Milacre ^{2/}
Sulfamate	DuPont's Ammate (contains 80% by weight of ammonium sulfamate plus inert materials)	<i>R. lacustre</i> (stream)	1.0 lb. Ammate
		<i>R. lacustre</i> (upland)	1.5 lbs. Ammate
		<i>R. petiolare</i> (stream)	1.0 lb. Ammate
		<i>R. inerme</i> (stream)	2.0 lbs. Ammate
		<i>R. viscosissimum</i>	2.0 lbs. Ammate
2,4-D	Dow Endowed (contains 60% by weight of the sodium salt of 2,4-D acid plus wetting agent plus inert materials)	<i>R. petiolare</i> (stream)	1 gal. of soln. containing 0.08% (800 p.p.m.) of 2,4-D acid. For the Endowed this is 1 gal. of soln. from a batch made by dis- solving 1.67 oz. of dry powder in 10 gals. water.

^{1/} Instructions for practical work: Dissolve Ammate at rate of 1 lb., or Endowed 0.167 oz., per gal. of water; apply as a combined aerial spray and soil drench, wetting all leaves and stems to the point of dripping and applying balance of dosage to crown centers. Tergitol #7 should be used in all Ammate spray solutions at the rate of about 1 tbsp. for each gal. of spray solution. Dow Endowed (2,4-D) already contains some wetting agent, but for most ribes species the addition of some Tergitol (about 1/2 tbsp. for each 10 gals. of spray soln.) will be helpful.

^{2/} This is the basic dosage that would be applied per unit of ground fully occupied by ribes and is considered to be the average dosage for the species. In actual practice the gallonage needed to provide adequate coverage of any species will vary according to the size and density of the stems and foliage. For example, some stands of *R. lacustre* can be adequately treated by 3/4 gal. per milacre, while others may take as much as 2 gals. For one or two-year-old plants the concentration and dosage of 1 lb. of Ammate per gal. and 1 gal. per milacre can probably be modified to use less chemical and more water, but little experimental data are yet available on the susceptibility of young plants.

Test in Broadcast Spraying Using Ammate Weed Killer (Ammonium Sulfamate) for Destroying Ribes in Cut-over Type.

This study was instituted by Mr. Swanson with Messrs. Walters, Riley and Moss assisting in the field application. Effectiveness of treatment will not be known until the 1946 season. A chronological report of the study and comments by Mr. Swanson follow:

Plot Locations: Potter Creek, Coeur d'Alene National Forest.

Status of Area: Logged 1941, steep slope, brushy cover and windfalls, plot strips established perpendicular to slope between parallel roads about 627 feet apart.

Ribes: Large number of R. lacustre; few R. viscosissimum. Ribes seedlings one to five years old, some mature bushes.

Equipment: Hardie Sprayer, 30 gallons per minute, Imperial Pump mounted on $1\frac{1}{2}$ -ton truck. Capacity--400 gallons, pressure 400 pounds; Bean Sprayer Gun #789, 7/16 inch pressure hose.

Chemical: Total 2100 pounds Ammate Weed Killer, (ammonium sulfamate).

Date of Test: August 21-25, weather clear except cloudy on August 25 and light showers late afternoon.

Method: One hoseline and nozzle per chain-wide strip. Most practical way to work strip is to locate spray rig on upper end of strip and work hose lines down hill. If spray rig can only be located at bottom of strip, it is advisable to coil hose in sections, distribute at proper intervals along strip, then lay out hose line, connect sections, and work strip from top down. Laying hose line required 20 to 30 minutes per acre; refilling of 400-gallon tank required 25 minutes.

Plot Records

Plot No. 1

Acres: 4.75

Strips: 5, each 1 chain by $9\frac{1}{2}$ chains

Chemical: 1690 pounds Ammate Weed Killer

Solution: 3260 gallons (1/2 lb. chemical per gallon of solution)

Nozzle disc apertures: 5/64" and 6/64"

Total man hours on nozzle: 20 hours and 55 minutes

Total man hours by strips:

Strip 1: 3 hours, 54 minutes

Strip 2: 4 hours, 38 minutes

Strip 3: 4 hours, 6 minutes

Strip 4: 4 hours, 9 minutes

Strip 5: 4 hours, 8 minutes

Plot No. 2

Acres: .45

Strips: Two short strips 1 chain wide by $2\frac{1}{2}$ and 2 chains long, respectively.

Chemical: 210 pounds Ammate Weed Killer

Solution: 280 gallons ($\frac{3}{4}$ lb. chemical per gallon of solution)

Nozzle disc aperture: $\frac{5}{64}$ " and $\frac{6}{64}$ "

Total man hours on nozzle: 2 hours

Plot No. 3

Acres: .93

Strips: Four strips each 1 chain wide by 3, 3, $1\frac{3}{4}$, and $1\frac{1}{2}$ chains long, respectively

Chemical: 200 pounds Ammate Weed Killer

Solution: 800 gallons ($\frac{1}{4}$ lb. chemical per gallon of solution)

Nozzle disc aperture: $\frac{1}{8}$ "

Total man hours on nozzle: 3 hours, 54 minutes

Total man hours by strips:

Strip 1: 1 hour, 10 minutes (approximately 230 gallons)

Strip 2: 1 hour, 2 minutes (approximately 200 gallons)

Strip 3: 51 minutes (approximately 185 gallons)

Strip 4: 51 minutes (approximately 185 gallons)

Comments:

The test demonstrated the practicability of using power equipment in spraying 100 percent of the ground cover on cut-over areas. Under conditions of this test, approximately three-quarters of a man-day per acre represented the overall requirement. Solution was applied at the rate of about 800 gallons per acre. The success of this method is dependent upon a low cost chemical which will kill the upland ribes. As yet, the effectiveness of Ammate in this type of test is not known. While it is reasonable to expect some decrease in price of Ammate, the present price of 14 cents per pound makes the chemical costs on the plots approximately \$50.00, \$65.00, and \$28.00 per acre.

The Effects of Variable Light and Moisture Conditions on the Germination, Growth and Development of Ribes lacustre, R. viscosissimum and Pinus monticola

This study was established in 1940 to determine factors influencing germination, survival and growth of the region's two major upland ribes species in association with western white pine under full sun, half shade and full shade light intensities. At each of these light stations seeds of ribes and white pine were sown on natural duff, mineral and burned-mineral soil surfaces. Dimensions of these soil surfaces were 8 by 10 feet with each divided into 20 subplots 2 feet square. This division made 5 rows of subplots 4 wide for each soil surface. With 20 subplots, 5 were assigned to each species of ribes, western white pine, and checks for natural seed germination. Each row of 4 subplots represented sowings of the two ribes species, white pine and a check subplot. Choice of subplot was made by random selection for each row. Rodent and bird-proof enclosures were constructed for each soil surface.

Germination, survival and growth studies were instituted in 1941 and continued in part through the 1945 season. Ribes surviving the 1943 growth season were removed, a practice continued with newly germinated ribes to avoid spread of the rust to natural pine in the vicinity of the plots. Removal of the ribes from the 1, 3, and 5 rows of subplots of each soil surface was accomplished by pulling, and from the 2 and 4 rows by shearing off at ground level with pruning clippers. The purpose of disturbing the soil surfaces of subplot rows 1, 3 and 5 by pulling of ribes followed by complete mechanical disturbance, was to attempt to stimulate germination in a study of viability. Subplot rows 2 and 4 were left undisturbed except for the removal of ribes at ground level by pruning shears to check germination of seed sown on original or undisturbed soil surfaces. Further discussions of this study have been presented in the 1940 to 1944 annual reports.

TABLE 1

NUMBER OF RIBES AND WHITE PINE SEED GERMINATING DURING THE SEASONS 1941, 1942, 1943, 1944 AND 1945; TOTAL SEED GERMINATING DURING THIS PERIOD AND PERCENT OF TOTAL SEED SOWN GERMINATING

Surface	Species	Light Intensity	Number Seeds Germinating by Seasons					Total Seed Germ.	Percent of Total Seed Sown Germ.
			1941	1942	1943	1944	1945		
Duff	Ribes lacustre	Full Sun	15	674	19	0	0	708	4.425
		Half Shade	42	1,348	239	12	0	1,641	10.26
		Full Shade	771	5,968	479	297	193	7,708	48.175
	Ribes viscosissimum	Full Sun	16	2	0	0	0	18	1.125
		Half Shade	54	1	0	0	0	55	3.44
		Full Shade	288	0	68	15	9	380	23.75
	Western White Pine	Full Sun	20	6	0	0	0	26	1.30
		Half Shade	49	90	5	0	0	144	7.20
		Full Shade	841	212	32	0	0	1,090	54.50
Mineral	Ribes lacustre	Full Sun	3,184	2,134	57	0	0	5,375	33.59
		Half Shade	2,725	6,078	367	16	0	9,186	57.41
		Full Shade	1,937	6,191	1,992	355	186	10,671	66.69
	Ribes viscosissimum	Full Sun	1,322	7	0	0	0	1,329	8.31
		Half Shade	1,092	11	0	0	0	1,103	6.89
		Full Shade	1,083	0	3	18	7	1,111	6.94
	Western White Pine	Full Sun	883	14	0	0	0	897	44.85
		Half Shade	1,170	29	11	0	0	1,210	60.50
		Full Shade	1,434	44	21	0	0	1,499	74.95
Burned-Mineral	Ribes lacustre	Full Sun	1,966	5,967	23	0	0	7,956	49.72
		Half Shade	2,650	8,493	437	7	0	11,587	72.42
		Full Shade	2,233	6,326	1,183	52	39	9,833	61.46
	Ribes viscosissimum	Full Sun	740	13	0	0	0	753	4.71
		Half Shade	1,556	19	0	0	0	1,575	9.84
		Full Shade	1,554	0	44	7	2	1,607	10.04
	Western White Pine	Full Sun	314	1	0	0	0	315	15.75
		Half Shade	1,200	39	7	0	0	1,246	62.30
		Full Shade	1,379	49	13	0	0	1,441	72.05

In Table 1 are shown the number of ribes and white pine seeds germinating from 1941 through 1945. The total number of seed and the percent of total seed sown germinating are also given. Ribes seeds were sown at the rate of 800 per square foot, or 3,200 per subplot, totaling 16,000 per plot, or soil surface. Seeds of white pine were sown at the rate of 100 per square foot, 400 per subplot, or 2,000 per plot or soil surface.

Of particular interest in the application of results to operational use is the contrast in quantity and period of seed germination between R. lacustre and R. viscosissimum. Seed of R. lacustre germinates readily and appears to retain viability longer than seed of R. viscosissimum under all conditions studied. It will be noted that differences in soil surfaces and light intensities have materially influenced the extent of germination between species and seed of the same species. With but few exceptions, germination increased toward conditions of full shade with its minimum soil moisture and soil temperature variations. Longevity or years which seed will retain viability undoubtedly has been influenced by soil moisture-soil temperature relationships, and to some extent possibly by seed becoming too deeply buried in the soil medium for germination.

TABLE 2

NUMBER OF SEED GERMINATING ON DISTURBED (1943) AND UNDISTURBED SOIL SURFACES WHEN CALCULATED ON THE BASIS OF TOTAL AREA SOWN PER SPECIES IN EACH PLOT

Surface	Status of Surface	R. lacustre			R. viscosissimum			White Pine		
		Full Sun	Half Shade	Full Shade	Full Sun	Half Shade	Full Shade	Full Sun	Half Shade	Full Shade
1944 Germination										
Duff	Disturbed	0	17	470	0	0	18	0	0	0
	Undisturbed	0	3	25	0	0	0	0	0	0
Mineral	Disturbed	0	22	578	0	0	23	0	0	0
	Undisturbed	0	5	30	0	0	0	0	0	0
Burned-Mineral	Disturbed	0	10	75	0	0	13	0	0	0
	Undisturbed	0	2	12	0	0	0	0	0	0
1945 Germination										
Duff	Disturbed	0	0	307	0	0	15	0	0	0
	Undisturbed	0	0	15	0	0	0	0	0	0
Mineral	Disturbed	0	0	301	0	0	12	0	0	0
	Undisturbed	0	0	9	0	0	0	0	0	0
Burned-Mineral	Disturbed	0	0	62	0	0	3	0	0	0
	Undisturbed	0	0	3	0	0	0	0	0	0

In Table 2 are shown the number of seeds germinating on disturbed and undisturbed soil surfaces. At the full sun station the disturbance of the soil surface was no added incentive for germination, the conclusion being that high soil temperature and low soil moisture were detrimental and caused seed devitalization. Under conditions of half shade the disturbance resulted in a slight increase of germination for R. lacustre seed over undisturbed subplots the year

following the disturbance. It is apparent that some seed buried too deeply for germination required aeration; otherwise seed devitalization resulted from soil temperature-soil moisture variations. At the full shade station the disturbance has been responsible for greatly increasing germination of R. lacustre seed and has added to the germination of R. viscosissimum seed.

The soil surface disturbance study has substantiated accrued knowledge that (1) seed devitalization results from soil temperature-soil moisture variations because longevity increases with uniformity of seed-storage environment and, (2) some seed becomes buried too deeply in a course of a few years for germination. Without aeration resulting from a disturbance of the soil medium the seed goes into a dormant condition.

An additional study upon longevity of ribes seed in relation to storage environment was undertaken this season with the recovery of ungerminated seeds from the disturbed subplots of each soil surface. This was accomplished by screening soils from each subplot to a depth of about 3 inches. Residues were retained from 20 and 30 mesh screens for further processing and recovery of seeds. Samples have been shipped to the Berkeley laboratory for final processing and germination studies of the recovered ribes seeds. Results of this study will be reported in the 1946 annual report.

Longevity of Ribes Seeds as Affected by Change of Storage Environment Resulting from Cutting of Mature Timber.

During the field season of 1944 a series of soil disturbance plots was established to determine relation of altered storage environment on the longevity of ribes seeds. The disturbance was accomplished by removal of the duff and thoroughly mixing the organic mantle with the top inch of mineral soil. A Latin Square plot was employed seven milacres in dimension. Each horizontal tier of seven milacres was established as a separate unit to avoid areas of burned slash piles and major skid trails. One milacre in each tier was selected at random for the disturbance. Every other year an additional milacre will be selected and subjected to similar treatment until six of the seven milacres in each tier have been disturbed for germination of ribes seed. The seventh milacre in each tier will remain undisturbed for a check. Additional discussion on the establishment and objectives of this study is reported in the 1944 annual report.

TABLE 3

NUMBER OF ORIGINAL RIBES BY SPECIES REMOVED FROM INDIVIDUAL MILACRES
IN 1944 AND NEW SEEDLING GERMINATION ON MILACRES DISTURBED
BY REMOVAL OF RIBES OR BY 100 PERCENT DISTURBANCE OF THE
SOIL SURFACE, LACLERC CREEK, KANIKSU FOREST

Subplot No. and Ribes Species	Original Ribes (OR) New Germination (NG)											
	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG
Subplot No.	1		2		3		4*		5		6	
R. viscosissimum	1	0	4	0	12	0	21	0	25	0	19	0
R. lacustre	2	0	2	0	7	0	2	0	4	0	6	0
Subplot No.	8		9*		10		11		12		13	
R. viscosissimum	5	0	12	0	2	0	4	0	8	0	14	0
R. lacustre	2	0	5	0	0	0	0	0	4	0	2	0
Subplot No.	15		16		17		18		19*		20	
R. viscosissimum	0	0	0	0	1	0	2	0	0	0	2	0
R. lacustre	1	0	0	0	0	0	0	0	2	0	5	0
Subplot No.	22		23		24		25*		26		27	
R. viscosissimum	6	0	6	0	0	0	0	0	0	0	0	0
R. lacustre	3	0	0	0	6	0	0	0	8	0	0	0
Subplot No.	29		30		31*		32		33		34	
R. viscosissimum	3	0	4	0	2	0	0	0	0	0	0	0
R. lacustre	0	0	3	0	0	0	0	0	0	0	0	0
Subplot No.	36		37		38		39		40*		41	
R. viscosissimum	0	0	2	0	2	0	3	0	1	0	0	0
R. lacustre	0	0	0	0	0	0	1	0	0	0	0	0
Subplot No.	43		44		45		46		47		48	
R. viscosissimum	1	0	6	0	1	0	2	0	1	0	3	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0

*Designates subplots disturbed 100 percent in 1944.

In Table 3 are shown the number of original ribes removed from individual milacres of the plot located on the East Branch of LaClere Creek, Kaniksu Forest. White pine logs were removed from this area in 1939 with some mixed and all cedar taken in 1941. On the average the heavy cut has resulted in an alteration of light intensities from less than 10 percent full sunlight before logging to better than 80 percent full sunlight after the removal of all merchantable trees. On a western exposure, the organic mantle has been observed to become tinder dry by midsummer. Ribes seeds stored within or beneath the organic mantle on top of mineral soil are thus subjected to relatively high soil temperatures and low soil moisture content during the summer months. Such an environment is a cause of seed devitalization. With four to six years' time elapsed since logging and the resulting alteration of the seed storage environment, no new ribes seedlings have been found germinating on the disturbed milacre plots or adjacent areas under observation. It can be tentatively concluded that stored ribes seeds have become devitalized through the drastic alteration of soil moisture, soil temperature, and the exchange of soil gases.

TABLE 4

NUMBER OF ORIGINAL RIBES BY SPECIES REMOVED FROM INDIVIDUAL MILACRES IN 1944 AND NEW SEEDLING GERMINATION ON MILACRES DISTURBED BY REMOVAL OF RIBES OR BY 100 PERCENT DISTURBANCE OF THE SOIL SURFACE, POTTER CREEK, COEUR D'ALENE NATIONAL FOREST

Subplot No. and Ribes Species	Original Ribes (OR)				New Germination (NG)			
	OR	NG	OR	NG	OR	NG	OR	NG
Subplot No.	1	2	3	4	5*	6	7	
R. viscosissimum	1	0	0	0	0	0	0	0
R. lacustre	5	0	0	0	26	0	13	0
Subplot No.	8	9	10	11	12*	13	14	
R. viscosissimum	0	0	0	0	0	1	0	0
R. lacustre	0	0	12	0	0	0	8	0
Subplot No.	15	16*	17	18	19	20	21	
R. viscosissimum	0	0	0	0	0	0	0	0
R. lacustre	0	0	1	0	0	0	1	0
Subplot No.	22	23*	24	25	26	27	28	
R. viscosissimum	0	0	0	0	0	0	0	0
R. lacustre	0	0	0	0	0	0	0	0
Subplot No.	29	30	31	32	33	34*	35	
R. viscosissimum	0	0	0	0	0	0	0	0
R. lacustre	5	0	7	0	0	0	6	0
Subplot No.	36	37	38*	39	40	41	42	
R. viscosissimum	0	0	0	0	1	0	2	0
R. lacustre	0	0	2	0	10	0	20	0
Subplot No.	43	44	45	46	47	48*	49	
R. viscosissimum	0	0	0	0	0	0	0	0
R. lacustre	0	0	0	0	0	0	2	0

*Designates subplots disturbed 100 percent in 1944.

The Potter Creek study located on the Coeur d'Alene National Forest is shown in Table 4. This area was logged in 1941 with improvements a year earlier. The exposure selected for study faces north by a few degrees east. Early bug loss by the mountain pine beetle Dendroctonus monticolae had resulted in some canopy openings; but on the whole, the original stand was sufficiently dense to inhibit development of nearly all brushy plants. The site as would be expected on a steep north exposure, was moderate to heavily moist. After logging it was observed that by midsummer the organic mantle was fairly dry but mineral soil remained moist throughout the season. Surprising has been the fact that new ribes germination has not resulted from the plot disturbances nor can new seedlings be found on the area as a whole the fourth year after logging. One exception was the germination of a R. lacustre seedling from the debris removed off milacre number 34. Since R. lacustre has proven the more troublesome of the two upland species in germination and longevity of seeds, these early observations are hardly sufficient to warrant conclusions. It might be added that the results to date are highly encouraging since it was suspected that germination would be exceedingly heavy for R. lacustre on the Potter Creek plot.

TABLE 5

NUMBER OF ORIGINAL RIBES BY SPECIES REMOVED FROM INDIVIDUAL MILACRES
IN 1944 AND NEW SEEDLING GERMINATION ON MILACRES DISTURBED
BY REMOVAL OF RIBES OR BY 100 PERCENT DISTURBANCE OF THE
SOIL SURFACE, CORBETT CREEK, ST. JOE FOREST

Subplot No. and Ribes Species	Original Ribes (OR)				New Germination (NG)							
	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG	OR	NG
Subplot No.	1	2	3	4*	5	6	7					
R. viscosissimum	0	0	0	0	1	0	2	1	1	0	2	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	8	9	10	11	12*	13	14					
R. viscosissimum	0	0	0	0	0	0	1	0	0	0	1	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	15	16	17	18	19	20	21*					
R. viscosissimum	1	0	3	0	16	0	0	0	0	0	1	0
R. lacustre	2	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	22	23	24*	25	26	27	28					
R. viscosissimum	3	0	30	1	3	0	0	0	0	0	4	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	29*	30	31	32	33	34	35					
R. viscosissimum	19	12	5	0	0	0	0	0	0	0	0	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	36	37	38*	39	40	41	42					
R. viscosissimum	0	0	0	0	0	0	10	0	1	0	0	0
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0
Subplot No.	43	44	45	46	47	48*	49					
R. viscosissimum	0	0	12	1	15	0	11	0	11	0	1	1
R. lacustre	0	0	0	0	0	0	0	0	0	0	0	0

*Designates subplots disturbed 100 percent in 1944.

The Corbett Creek plot is located on a fork of the west branch of Merry Creek, St. Joe Forest. Cutting of mature timber from this fork was over a three-year period, 1935 to 1937. The plot was established on area cut of timber in 1936. The degree of cut was relatively light since for the most part white pine was the only species removed. The residual stand is composed mainly of cedar and grand fir. The irregular pattern of cut has resulted in conditions representing quite a variation in intensities of light. It was possible, therefore, to distribute the series of seven milacres over a wide range of environmental conditions. The area selected for study has a northeasterly exposure with moderate steepness. The soil is of a heavy loam retaining surface moisture throughout the season except where cutting has been heavy.

It is not difficult to visualize the degree of canopy opening, or the alteration of the seed-storage environment by the new ribes seedlings occurring on the milacre plots. It was generally found that where new germination occurred, the seed-storage environment was least altered from the original condition existing under a dense mature stand of timber. Considerable evidence was apparent from this study that the length of time old ribes seeds will remain viable following a major disturbance is dependent upon the degree to which the seed-storage environment is altered by removal of the canopy. A more direct approach to this question will be made commencing next season by the screening and recovery of ribes seeds from storage for germination tests.

DISEASE CONTROL PLOT STUDIES

Infection Conditions during 1945

During July, weather conditions were unfavorable for the development of the rust because air temperatures were high with only slight traces of rain on two days. In August there were eight days with at least a sprinkling of rain, but temperatures remained high, making conditions unfavorable for rust development. Urediospores, however, developed well on ribes. In fact, an inspection of ribes on all permanent north Idaho plots showed that rust development was about on a par with the previous season. Plots on the Clearwater National Forest exhibited increased ribes infection, while those on the Kaniksu National Forest exhibited decreased ribes infection.

September 15-17 and September 20-26 were periods favorable for pine infection since both were relatively cool, rainy, and cloudy. Considerable spread from ribes to pine and subsequent infection of the pine may have taken place during these two periods.

Pine inspections finished the last season verified the conclusion that there has been little, if any, infection since 1941.

Pine Infection Adjacent to the Powder House Plot

During 1944 the entire Powder House plot was sampled to determine average conditions of infection existing within the plot boundaries. Results indicated that infection on the plot averaged approximately 32 percent. This season, sample strips were extended from the sides of the plot to determine the average percentage of infection in the areas immediately adjacent to the plot boundaries. Results of this sampling indicated that on areas adjacent to the south and east boundaries the infection averaged approximately 36 percent, while on the area adjacent to the north boundary the infection averaged approximately 42 percent. No sampling was done on the west boundary of the plot as that side borders on a large pole type. Comparison of the average percentages of infection in and around the plot led to the conclusion that there was slightly less infection on than around the plot.

Further Ribes Reduction on the Powder House Plot

There have been two reductions made in the number of ribes on the 95-acre Powder House plot since it was established in 1938. The original plot supported 161 ribes. These were reduced in 1940 to 70 ribes, and again during the past season to 17 ribes. Live stem of the original 161 ribes was 2,924 feet. This was reduced in 1940 to 1,975 feet, and again this season to 381 feet.

The Powder House Western White Pine Pruning Experiment

Since 1940 there has been considerable interest expressed throughout this region regarding the possibility of salvaging blister rust infected white pine stands through pruning procedures. In this light several pruning projects have been undertaken since that time. These have been on a relatively large

scale, practical basis with all infected trees pruned. Outside of these practical experiments, there is an extensive literature dealing with recent blister rust control pruning experiments, and with earlier ventures in which pruning was undertaken for reasons other than blister rust control. Throughout this literature there is a wide divergence in conclusions as to the best pruning methods to employ.

Summarizing the literature briefly, without actually citing it, this divergence in opinion concerning pruning practice may be shown as follows:

1. (a) pruning in relation to blister rust control has been variously described as valueless on heavily infected areas but of some value on lightly infected areas; (b) as preventing losses in already infected stands but valueless without further ribes eradication; (c) in the writer's opinion, valuable on heavily infected areas where pruning for salvage is the only method which will assure a reasonable stocking but valueless in lightly infected stands where ribes have been satisfactorily reduced and where additional small losses from the rust will not materially reduce the final stocking.
2. The height to which white pine and other species should be pruned is also a matter of much controversy. Recommendations vary from one-fifth to three-quarters of the live crown height.
3. Opinions as to the number of trees per acre that should be pruned are likewise variable, ranging from 100 to 200 trees per acre when pruning for silvicultural reasons, and ranging up to and including all white pine trees when pruning to reduce blister rust losses.
4. Several recommendations as to the earliest age at which pruning measures should be inaugurated are also found in the literature, apparently varying depending on the purpose for which the pruning is being done. Silviculturists generally agree that pruning should not be undertaken until the stand has attained the age of twenty years. Blister rust workers, on the other hand, realizing that the greatest rust losses take place when the stand is under twenty years of age, have recommended pruning to reduce rust damage at an earlier age.

Furthermore, there seems to have been no previous experimentation aimed at answering questions regarding correct procedures when pruning both for the reduction of rust damage and in view of selection of probable crop trees (selective pruning).

Due to the existing difference in opinion and conclusion regarding pruning measures, this study was begun. Its object is to determine the best procedures for pruning blister rust infected stands on a selection basis when pruning is employed to reduce rust damage to secure, at rotation age, a fully stocked stand composed of the most desirable white pine individuals.

I. Methods Employed in the Pruning Experiment.

A. Selection of the Experimental Area

The Powder House plot on the Clearwater National Forest was chosen as the experimental area for the following reasons: (a) The entire plot area was already surveyed and staked out in one chain squares. (b) The pine infection on

the area had reached an advanced enough stage (varying widely around the 32 percent average of 1944) so that pruning might be expected to shed some light on the benefits under conditions of heavy infection. (c) The area was naturally stocked and supported white pines both older and younger than 20 years of age.

B. Arrangement of the Pruning Blocks within the Plot

The entire eastern side of the Powder House plot area was allotted to this pruning study. Thirteen blocks of white pine reproduction were laid out on this area. Eleven of these blocks, varying in size from 2 to 30 square chains, were used this season to accommodate the various combinations of pruned trees per acre, percentage of infection, and original natural stocking. Data on the stocking, the existing infection, and the number of trees planned to be selectively pruned per acre are shown in Table 1 below to demonstrate the range of conditions.

TABLE 1

ACREAGE, STOCKING, PERCENT INFECTION, AND PRUNING STANDARD ON ELEVEN TREATED BLOCKS

Block Number	Block Acreage	No. Pines on Entire Block	Estimated No. Pines Per Acre	Percent Infection	Pruning Standard No. Trees Per Acre
1	1.6	1,080	675	58	120
2,3,& 4	1.2	1,336	1,113	64	360
5	0.4	357	892	37	240
6	0.4	268	670	27	240
8	0.4	634	1,585	30	240
9	1.6	1,146	716	31	360
10	3.0	1,560	520	29	240
11	0.2	78	390	20	240
12	1.6	446	279	37	240

Two blocks, numbers 7 and 13, were not treated this season. They are of use, however, as checks.

Height of pruning on the 11 treated blocks was confined to one-third of the live crown height of the trees but another series of tests was established on the Powder House and Hollywood plots wherein trees were pruned to various heights. In order to determine what pruning to one-third of the live crown height meant in terms of foliage removed, another small study was made to determine the amount of foliage removed when pruning to one-third of live crown height.

C. Pruning in Relation to Control of Blister Rust Damage

Over a period of years it has been determined that branch cankers over 12 inches from the trunk and without intervening live lateral or sub-lateral branches will in the great majority of cases not reach the trunk. With this in mind, the distance between the nearest canker and trunk was recorded on all

infected pruned trees. This figure was then used to determine whether or not pruning had saved the particular pruned tree from eventual death caused by the rust. Accumulated data of this sort were then used to give an over-all measure of pruning salvage.

D. Selective Pruning Methods

It has already been stated that one of the primary objectives of this experiment was to determine standards and effectiveness of pruning for the control of blister rust damage on a selection basis, i.e., pruning the best crop trees only. In this experiment selective pruning standards of 100, 200, and 300 trees per acre were chosen. The three standard numbers were then increased by 20, 40, and 60 trees per acre respectively, the increases representing a margin of safety to cover subsequent blister rust losses due to the failure to prune all potentially damaging cankers during treatment.

Following these standards, the problem of distribution of the trees to be pruned over the pruning block was considered. It was decided that each pruning block would be divided into 120 equal sub-blocks, $16\frac{1}{2}$ by 22 feet (19 by 19 feet in the case of block 12) in size. Hence, to obtain the standard of 120 pruned trees per acre evenly distributed over the pruning block one tree was selected and pruned in each sub-block; the standard of 240 trees per acre, two trees per sub-block; and the standard of 360 trees per acre, three trees per sub-block. Figure 1, a tabular representation of how sub-blocks were placed in the blocks, shows how this method of obtaining even distribution of the selectively pruned trees actually worked out on the ground in blocks 1, 2, 3, and 4. It will also be noticed from Figure 1 that certain of the selectively pruned trees had excised trunk cankers. Such trunk-cankered trees were selected only when distribution of suitable trees on the sub-blocks was below standard and the cankered trees were the only available substitutes.

E. Personnel Used for the Selective Pruning Experiment

Personnel employed to do the labor required in the selective pruning work numbered four. Two were obtained through the Office of Blister Rust Control and two through the Supervisor's Office of the Clearwater National Forest.

F. Check Trees and Check Areas

During the course of the selective pruning work, occasions arose where it was possible to select trees similar in diameter, height, and other characteristics which were adjacent to each other on the sub-blocks. Thirty-six such paired trees were found; one was pruned to one-third of its live crown height while the other was merely measured and remained untreated as a check (photo W355). In blocks where selective pruning requirements left few trees on the sub-blocks which were suitable for use as paired trees, it was necessary to select similar trees from adjacent unpruned areas. Thirty of these adjoining check trees were selected and measured. In addition, the large three-acre block (No. 13) and the smaller block (No. 7) remained untreated this season and are useful as check areas.

FIGURE 1

TOTAL NUMBER OF TREES, NUMBER OF INFECTED TREES, AND NUMBER OF TREES SELECTIVELY PRUNED ON THE SIXTEEN AND ONE-HALF BY TWENTY-TWO FOOT SUB-BLOCKS AS THEY ARE LAID OUT ON BLOCKS 1, 2, 3, AND 4

A.

Tree Selection for Pruning Based on a Standard of 120 Trees Per Acre or 1 Per Division

	No. Trees		No. Inf.		No. Trees		No. Inf.		No. Trees		No. Inf.		No. Trees		No. Inf.		No. Trees		No. Inf.		No. Trees		No. Inf.		No. Trees		No. Inf.		No. Trees		No. Inf.	
	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.	No. Trees	No. Inf.		
Block 1	11	4 1	5	2 1	- - -	1 - 1	1 - 1	1 - 1	6	2 1*	15	3 1	9	4 1*	14	6 1	10	4 1	9	4 1												
	3	- 1	- - -	3 1 1	- - -	- - -	- - -	- - -	7	2 1*	3	- 1	23	10 1	23	6 1	9	3 1	9	4 1												
	2	- 1	- - -	3 1 1	4	1 1	4	2 -	2	1 1	2	1 -	19	8 1	13	6 1	16	6 1	23	10 1	19	6 1										
	5	2 1	2	1 -	13	4 1	8	4 1	1	- 1	4	2 1	23	10 1	15	7 1	3	1 1	12	5 1	14	5 1	17	6 1								
	8	3 1	8	3 1*	5	1 1	14	6 1	5	2 1	2	1 1	4	1 1	3	1 -	17	6 1	6	2 1	7	1 1	4	1 1								
	7	2 1	4	1 1*	2	1 -	10	4 1*	11	4 1	10	5 1*	3	1 1	10	3 1	7	1 1	4	- -	- - -	1	- 1									
	3	- 1	4	2 1	9	2 1*	5	2 1	6	3 1	4	2 1*	3	1 1*	2	- 1	5	1 1	10	4 1	3	- 1	2	1 1								
	18	8 1	10	4 1	7	2 1	6	3 1	8	4 1	11	5 1	4	2 1	13	5 1	11	5 1	3	1 1*	6	3 1	2	- 1								
	11	4 1	12	5 1	3	1 1*	4	2 1	4	2 1*	4	1 1*	6	2 1	5	1 1	7	3 1	4	- 1	5	1 1*	13	2 1*								
	8	3 1	4	2 1	7	3 1	3	1 1	8	2 1	8	4 1	6	1 1	8	4 1	2	- -	12	5 1	4	1 1	12	3 1								
	2	1 1	8	3 1	2	- -	3	1 1	8	2 1	18	8 1	18	8 1	10	3 1	11	4 1	27	12 1	3	1 1	9	3 1								
	9	3 1	15	5 1	3	1 1*	3	1 1	7	3 1	20	9 1	15	6 1	13	5 1	13	6 1	15	4 1	11	2 1	15	6 1								
	4	2 1	34	13 1	5	2 1	2	1 -	- - -	2 - -	4	1 1	8	1 1	10	3 1	30	12 1	32	14 1	38	12 1										
	8	3 1	13	5 1	5	2 1	4	1 1	- - -	9	4 1	3	1 1	20	6 1	12	4 1	5	- 1	11	5 1	12	3 1									
	3	1 1	10	4 1	2	- -	12	6 1	5	1 1	14	7 1	6	3 1	11	4 1	33	14 1	10	2 1	25	11 1	34	11 1								
	16	7 1	- - -	2	1 -	11	5 1	3	1 1	15	6 1	14	6 1	30	13 1	16	6 1	9	3 1	19	7 1	38	15 1									

B.

Tree Selection for Pruning Based on a Standard of 360 Trees Per Acre or 3 Per Division

Block 2	33 10 3*	8 3 1	- - -	7 2 2*	2 1 1	3 1 -	11 5 3	28 12 4*	8 4 2	3 1 1	11 5 4*	31 12 4*
	20 6 3	11 4 2*	- - -	9 4 2	9 4 -	16 7 3	9 4 2	9 3 2*	8 3 2	15 7 4	12 5 2	35 13 4*
	13 5 4*	11 4 1	4 1 1	1 - 1	5 2 2	21 10 3	18 8 3	22 9 3*	5 1 2	7 3 2	22 7 3	65 24 4*
	6 2 1	11 5 2	2 1 -	- - -	8 3 3	10 4 3	17 7 4	8 3 1	4 1 2	10 4 2	18 8 1	24 9 4
Block 3	3 1 2	2 1 1	2 1 1	5 2 2*	9 4 1	5 2 1	14 6 2	28 13 4*	24 6 4	27 13 4	6 2 3	26 10 4*
	1 - -	- - -	7 2 4	8 3 3	21 10 4	13 4 3	6 3 2	4 1 1	19 9 2	3 1 1	13 6 3	60 25 3
	- - -	- - -	4 - 1	3 1 1	20 8 4	8 4 3	13 6 3	5 2 2	- - -	8 3 3	32 13 5	37 14 3
	1 - -	1 - 1	9 4 2	3 1 1	12 4 3	8 3 3	43 17 4*	34 15 3*	9 4 2	15 6 2	20 9 3*	31 15 4*
Block 4	7 2 2*	14 6 3	7 3 3	9 4 2	11 5 3	12 5 2*	17 7 4	17 7 2	11 5 2	22 10 5	39 17 4	34 14 4
	13 4 2	23 4 3	10 2 3*	19 7 4	28 11 5	5 2 2	48 20 4	36 14 7	15 7 3*	1 - 1	27 13 4	3 - 1
	36 8 4	25 7 4	12 5 3	20 8 5	9 3 3*	14 3 3	45 15 6	29 13 5	11 4 2	8 4 4	11 2 2	4 1 2
	29 9 3	25 8 3	12 6 3	40 17 3*	56 20 4	23 8 3*	50 15 4	28 12 6	35 16 4	15 6 4	22 10 3*	2 1 -

*Tree with trunk canker selected as crop tree and canker cut out.



W355. An example of paired trees. Object is to determine the effect of pruning off one-third the crown height. Tree number 112P, unpruned, on the left and number 112, pruned, on the right. Trees approximately 20 feet tall and 3.5 inches in diameter at breast height. Powder House Plot. Pruned July 2, 1945 and photographed on July 23, 1945.

G. Pruning Tools and Pruning Technique

In this experiment two types of pruning saws, two types of hand pruners, and one type of long-handled pruner were used. A linoleum knife was used to excise trunk cankers.

Differences of opinion as to how close to the trunk to prune, and as to where the pruning cut should be placed in relation to the definite branch collar characteristic of western white pine, led in this experiment to pruning part of the trees as close to the trunk as possible while others were pruned just within the outer edge of the branch collar.

H. Pruning in Relation to Sunscald and Winter Injury, Disease and Insect Attack

Pruning commenced in June and continued into July. The different times of pruning, therefore, are to be considered in the light of what effect they may have on subsequent sunscald damage. Pruned trees in the open can also be compared with pruned trees in varying degrees of shade. Winter injury, also of common occurrence on pruned trees, plus disease and insect injury may also be investigated through comparisons of pruned and check trees.

II. Preliminary Results and Conclusions at the End of the First Season

A. Distribution of Stocking

By referring back to Figure 1 it can be seen just how closely tree distribution over blocks 1, 2, 3, and 4 fitted the layout of the sub-blocks. A tabular comparison between block 1, block 12, and the grouped blocks 2, 3, and 4, is given in Table 2 below.

TABLE 2

NATURAL DISTRIBUTION OF TREES ON THE EXPERIMENTAL PRUNING BLOCKS SHOWING THE EFFECT OF THIS DISTRIBUTION ON THE NUMBER OF TREES ACTUALLY PRUNED PER ACRE

Block Number	1	12	2, 3, & 4
Pruning Standard, Trees Per Acre	120	240	360
Estimated Natural Stocking, Trees Per Acre	675	279	1,113
Block Acreage	1.6	1.6	1.2
Total Number of Sub-blocks	192	196	144
Number of Sub-blocks Completely Unstocked, or Understocked in Some Degree for Meeting Standard	22	51	67
Percent of Sub-blocks Completely Unstocked, or Understocked in Some Degree for Meeting Standard	11	26	47
Actual Number of Trees Pruned Per Acre under Field Conditions	106	133	307 (265)*
Percent Fulfillment of Pruning Standard	88	55	85 (74)*

* Numbers in parentheses represent an estimation of conditions had not more than the standard number of trees been pruned on all sub-blocks.

Further examination of Figure 1 shows that within the blocks there are completely unstocked sub-blocks, sub-blocks which were stocked to varying extents but which supported no suitable trees for selective pruning; sub-blocks which were stocked to varying extents but which supported only one or two trees suitable for selective pruning, and sub-blocks upon which from one to four extra trees, above standard, were pruned. Returning to Table 2, it is apparent that the degree with which it is possible to fulfill the requirements of any selective pruning standard will depend to a large extent on the stocking and its distribution. The pruning standard was 88 percent fulfilled on block 1, where the pruning standard was low and the stocking average; it was only 55 percent fulfilled on block 12, where the pruning standard was average and the stocking low; and it was 85 percent fulfilled on the combined blocks 2, 3, and 4, where the pruning standard was high and the stocking dense. In the latter case, however, if the practice of increasing the number of pruned trees by pruning more than the allotted number on almost two-fifths of the sub-blocks had not been followed, the pruning standard would have been only 74 percent fulfilled.

B. Selective Pruning in Relation to Blister Rust Damage Reduction

It has been already stated that in this study only branch cankers 12 inches and less from the trunk, without intervening live lateral branches, were considered to be potentially killing cankers. Using this figure for a basis in determining the numbers and percentages of pruned trees which were saved from death due to blister rust by the pruning treatment we find that the percentages of pruned trees saved vary from 24 to 68 percent. Variation is apparently caused by differences in stocking, in distribution of stocking, in percentage of infection, and in the pruning standard. This information is summarized for each block and averaged for the entire pruned area in Table 3 below.

TABLE 3

A COMPARISON OF PRUNED AND UNPRUNED BLOCKS IN RELATION TO RUST DAMAGE REDUCTION

Pruning Standard, No. Trees Per Acre	120	240						360		Averages All Blocks
Block Numbers Included	1	5	6	8	10	11	12	2,3,& 4	9	
Stocking, No. Trees Per Acre	675	892	670	1,585	520	390	279	1,113	716	760
No. Trees Actually Pruned Per Acre	106	205	200	193	189	145	133	307	234	
Percentage of Infection	58	37	27	30	29	20	37	64	31	37
Percent Infected Pruned Trees without Killing Cankers	13	33	42	31	36	18	16	29	37	28
Percent of All Pruned Trees without Killing Cankers	32	62	74	60	76	69	62	42	77	62
Estimated No. Dominant & Co-dominant Trees Per Acre										
Pruned Surviving without Pruning or Further Infection	34	127	148	115	143	100	82	129	180	118
Estimated No. All Trees Per Acre Surviving without Pruning or Further Infection	343	423	565	1,252	425	325	191	607	577	523

Perhaps the most interesting thing that will be noticed about Table 3 is that the estimated residual (as yet uninfected or infected but potentially undamaged) stand remaining on the pruning blocks even without the pruning measures ranges from 191 to 1,252 trees per acre. This residual stand is composed of from 34 to 180 of the dominant and co-dominant trees which were selected for pruning in this experiment, plus other dominant and co-dominant trees which it may not have been necessary to prune due to their distribution, and the remainder of the uninfected or infected but potentially undamaged intermediate and suppressed trees.

It is realized that these residual stocking figures preclude any further intensification of the rust, and just what effect such intensification might have is not known at this time. Presumably some measure of stocking will be maintained, even on blocks where the infection averages 37 percent and will probably continue to increase. It is perhaps regrettable that the further reduction in stocking due to subsequent inroads of the rust cannot be estimated now. In this region, stands of this age-class with these conditions of stocking and infection existing cannot be classified as to future stand potentialities because the rust has not been present long enough to provide an answer. It appears from Table 3, however, that only in areas of low, poorly distributed stocking (such as block 12) will selective pruning measures be valuable. On block 12, it will be seen that the stocking is only 279 trees per acre, that the distribution of this stocking is irregular, yielding only 133 selectively pruned trees per acre, and that without such pruning only 191 poorly distributed, intermediate and suppressed trees would remain under stabilized rust conditions.

In relation to pruning from the standpoint of reducing rust damage, it is also of interest to note the occurrence of trees with excised trunk cankers used as selectively pruned trees. Referring back to Figure 1, it will be noticed that on block 1, 17 trees or 10 percent of those selectively pruned had excised trunk cankers. In comparison, on blocks 2, 3, and 4, where three times as many trees were pruned, only 27 trees or 7½ percent of those selectively pruned had excised trunk cankers. Even with a higher pruning standard and percentage of infection the greater density and better distribution of stocking on blocks 2, 3, and 4 allowed more leeway in avoiding the selective pruning of trunk-cankered trees.

C. Personnel Problems

Of four men employed as laborers in this exacting type of selective pruning work, only two met required standards of experience and efficiency. It was apparent from this that on large-scale selective pruning projects some difficulty would be encountered in obtaining the necessary personnel.

D. Pruning Tools and Techniques

Of two pruning saws used, one with long and nearly vertical teeth (about 6½ points to the inch), cutting on both push and pull strokes, was found to be best for pruning above the height reached by hand pruners. The saw was superior to the unwieldy type of long-handled pruner employed.

Of the two types of hand pruners employed, the Seymour Smith and Sons hand pruner proved to be less fatiguing and more efficient than the Wiss hand

pruner. Both of these hand pruners, however, were of the type having only one cutting edge, the other edge being merely a flat metal strip which the sharp edge cuts against. It is believed that considerable improvement in the work could be obtained by using pruners with two cutting edges and adjustable blades, as the Porter Pointcut Pruner. This, new type of pruner has been recommended by several other pruning investigators. The linoleum knife used to excise trunk cankers proved to be quite satisfactory.

E. Brush Disposal

Disposal of pruned limbs and trunk-cankered trees cut out to remove competition did not appear necessary as the number of trees treated per acre is small and the brush well distributed. If, however, prevention of aecial sporulation is an objective the following season, then the brush should be burned as about 10 to 20 percent of the excised cankers will sporulate the following spring.

F. Costs of Selective Pruning

In this experiment, where trees averaging 15 years in age and 18 feet in height were selectively pruned to one-third of their height, costs varied from \$3.20 to \$5.10 per hundred trees pruned. Other prunings in the 20 to 30 year age-class, pruning one-quarter to one-third of the height of the trees, have cost as little as \$1.35 to \$1.60 per hundred trees. It is felt, however, that pruning costs on this experiment could have been reduced if the work had been done on a larger scale and with more efficient tools.

G. Sunscald Symptoms

Two areas, one pruned in early June and the other pruned in early July, were checked in September for indications of injury due to scalding by the summer sun. The only symptom evident was a definite fading of the chlorophyll in the bark, resulting in varying degrees of reddish coloration on the west and south sides of the pruned trees. On the area pruned in June 39 percent of the trees exhibited this symptom while on the area pruned in July 58 percent of the trees exhibited this symptom. Further checking will reveal if the symptom is associated with sunscald injury of the pruned trees.

H. Insect and Disease Attack

Another, and possibly much more serious, type of injury associated with the pruning in this particular experiment was an unexpected attack of the pruned trees by beetles. Because of the extent of this injury, and because it may have been overlooked in unpruned western white pine stands of this age, observations on its association were made in some detail during the past season. For the present, however, only general information on the beetle attack will be given, the detailed information being held for a more complete report to follow at a later date.

The earliest pruning in this experiment began on June 1 and continued until June 15. On June 19 one pruned tree with an excised trunk canker was observed which was attacked near the ground by a Dendroctonus beetle (see W352).



W352. Attack of white pine tree number 66 in block 1 by *Dendroctonus valens* LeC. Tree was pruned one-third of its height and a large trunk canker cut out at the base on June 11, 1945. The tree was subsequently attacked by the beetle, the points of entrance being at the edge where the bark was removed. The channels on the right were cut out on July 17 and a pair of adult beetles were removed from each channel. Another channel is evident on the left. Tree is 16 years old, 20 feet high, and 4.80 inches in diameter at breast height. Photographed on July 23, 1945.



W370-1. Tree number 109 in block 1. Attacked by *Dendroctonus valens* LeC. Characteristic surface symptoms are excessive bleeding and longitudinal cracking of the bark. In this case the bark has been removed showing the extent of the damaged area and a single larva of the beetle. Photographed September 6, 1945.

Specimens of the beetle were sent to Mr. James C. Evenden, Entomologist, Forest Insect Laboratory, Bureau of Entomology and Plant Quarantine, Coeur d'Alene, Idaho, who identified it as Dendroctonus valens LeConte, the red turpentine beetle. Subsequent to this first discovered attack by the beetle it was noticed that a considerable number of the pruned trees were similarly infested, as were unpruned white pines, grand firs, western yellow pines and larches. It was further observed that unpruned white pines on sizable areas were dying and that of the three infested yellow pines found all were dead or dying.

The beetle problem was further complicated by its frequent association with a root rot fungus, probably Armillaria Mellea (Vahl.) Quel. Which of these, the beetle or the fungus, initiates the attack on white pine has not yet been determined, but in this case it is strongly indicated that primary attack may be attributed to the beetle (photos W352 and W370-1). In either event, it is believed that the beetles are attracted to the pruned trees by a flow of pitch from pruning wounds.

In early September a check was made in order to obtain some information on the extent and characteristics of the beetle infestation. The following data, Table 4, were gathered:

TABLE 4.

INFESTATION BY DENDROCTONUS VALENS IN RELATION TO TIME OF PRUNING

Time of Pruning	June 1-15	July 7-8
Number of Trees Checked	173	141
Total Number of Trees Attacked by Beetle	40	5
Percent of Trees Attacked by Beetle	23	3.5

It will be noticed that almost seven times more infestation by the red turpentine beetle took place on the trees pruned in June. This higher degree of infestation is attributed to the relatively greater amount of bleeding, or pitching, resulting from June pruning when the trees were growing most vigorously, and to the attraction which this pitch flow is believed to have for the beetles. Although it is not yet definitely known what percent of the trees will be killed as a result of this beetle infestation, it seems best that no pruning be done earlier than July if such infestations are to be held at a minimum.

Summary

An experiment considering the pruning of western white pine reproduction below 20 years of age, in view of treating only selected crop trees and in relation to reduction in blister rust damage, has been established embracing more than 10 acres in the Clearwater National Forest.

It has been found that a frequent cause of difficulty in the selective pruning of a predetermined standard number of trees per acre is the inequality of tree distribution over a natural area. Over-all per acre density of stocking is apparently correlated with this inequality in tree distribution.

Under the rust conditions encountered, selective pruning was found to save a maximum of almost 70 percent of the pruned trees from eventual death due to blister rust. The value of such pruning, however, especially in well-stocked stands of about 40 percent average infection, is questionable because it cannot at present be estimated what density of stocking would eventually be attained without the pruning. Selective pruning should apparently be reserved to very heavily infected areas or to areas of average infection where the stocking is quite low.

Severe beetle infestation by *Dendroctonus valens* LeConte has been found in selectively pruned plots. The beetles are believed to be attracted by the flow of sap from pruning wounds, and the intensity of their attack may be correlated with the relatively greater sap flow occurring on trees pruned early in the season.

III. LABORATORY, GREENHOUSE, AND SPECIAL ACTIVITIES

Laboratory, greenhouse, and special activities at Berkeley, California, at Spokane, Washington, and at Moscow, Idaho, were in progress during the spring and early winter of 1945. All regular methods personnel were engaged in these activities. C. R. Stillinger was assisted in compilation and analysis of disease study work by a part-time employee, Mrs. Evelyn J. Daubenmire.

Principal laboratory and greenhouse activities related to the testing of new plant hormone-type weed killers. Tests of 2,4-dichlorophenoxyacetic acid (hereafter called 2,4-D) and its water soluble analogs were made on duckweed, barley, and ribes in a series of tests designed to devise the most suitable formulae for field use. A concentration of 800 p.p.m. of 2,4-D (either as a sodium or ammonium salt; in mixture with Carbowax in acid, neutral or alkaline medium; as an acid, alkaline or neutral soap of triethanolamine; or as a sodium salt in mixture with excess sodium carbonate) proved to be fully effective on *Ribes roezli* under greenhouse conditions. The field tests based on the results of this preliminary laboratory and greenhouse work are given under "Improvement of Chemical Methods for Ribes Eradication" in this report.

Rapid microchemical methods were tested and used to analyze a large number of sugar-pine-type soils (Sierra Nevada) for the principal nutrient constituents of nitrogen, potassium, calcium, phosphorus, magnesium, manganese, etc., to establish correlations between *R. roezli* sites and chemical properties of the soil. The best correlation between sites of high ribes regeneration and the nutrient constituents of the soil was furnished by nitrate and ammonia nitrogen. Also some correlation was noted between nitrogen content of the soil and the record of fires over the area from which the soil sample had been collected.

Methods previously devised for extracting ribes seeds from duff and soil were used for processing samples from the Northwestern, Southern Appalachian, and Pacific Coast Regions.

Studies on the longevity and germinative reactions of ribes and pine seeds were continued, as were special activities in the design of methods for the statistical analysis of data on pine disease and completion of a report on blister rust damage and control requirements relative to age classes in the management

of western white pine. A summary report was prepared to describe and illustrate all special ribes eradication equipment devised during the past 20 years; H. Miller Cowling prepared considerable photographic material for this report.

In completing the above work, the following special reports were prepared and made available to blister rust personnel of the Northwestern and Pacific Coast Regions during the calendar year of 1945:

Blister Rust Damage and Control Requirements Relative to Age Classes in the Management of Western White Pine. (Preliminary Report to Spokane Office)
..... Virgil D. Moss

Bureau Ms. 7847:

Poison Oak (Rhus Diversiloba) and Its Control by Mechanical and Chemical Means.

..... H. J. Hartman and
H. R. Offord

Field Equipment Developed Specially for the Eradication of Ribes in the Northwestern and Pacific Coast Regions.

..... H. R. Offord
J. F. Breakey, and
L. P. Winslow

Serial No. 123:

Survival in the Greenhouse of Small Ribes Roezli Seedlings Following Removal of Aerial Parts.

..... L. P. Winslow

Serial No. 124:

An Ecologic History of a Ribes Population on an Upland Plot in the Central Sierra Nevada in Relation to Ribes Eradication Work.

..... C. R. Quick

Serial No. 125:

Experimental Germination of Ribes and Pine Seeds. Series of 1944.

..... C. R. Quick

Serial No. 126:

What an Ecologist Should Like to Know about an Herbarium Specimen.

..... C. R. Quick

Serial No. 127:

Microchemical Soil Tests on Soil Samples Collected in the Sugar Pine Forests of the Sierra Nevada Mountains.

..... L. P. Winslow

Serial No. 128:

Growth in the Greenhouse of Ribes, Ceanothus, and Sugar Pine Seedlings.

..... C. R. Quick

Serial No. 129)
Bureau Ms. No. 7711)

A Rapid Method for Estimating the Phytocidal Action of Chemicals.

..... H. R. Offord

Serial No. 130:

Growth of Sugar Pine Saplings on Crocker Ridge in an Area of Stagnated Reproduction.

..... C. R. Quick

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1945

By

Frank O. Walters, Assistant Regional Leader
H. Miller Cowling, Photographic Specialist

During the war years it has been possible to adequately maintain all the essential elements of the educational and photographic section. It is hoped that in the future some expansion of these facilities will be possible.

The photographic section extends its services to the Sugar Pine Region and to Pear Psylla Control.

A. Photographic Section

The purpose of this section is: (1) To maintain a pictorial record of control and investigative work, (2) to supply photographs, charts, maps and manuals for facilitating the field work, and (3) supply material for educational work.

Photographic work in the field was considerably restricted due to the press of other work during the forepart of the season. Numerous fires and inclement weather during the balance of the season imposed further restrictions on photographic work.

Due to their rated importance, however, all current series pictures were covered. There are now 34 separate series pictures in progress showing both the growth of white pine under variable conditions as well as the progress of the disease on white pine. Series pictures are taken from the same point of the various subjects in periodic series from three months to two years depending upon the subject's progress requirements. One series of pictures showing the natural regeneration of white pine following logging is now in its fifteenth year and records some very valuable forestry data.

Although photography is the major project of this section, other operations are Multilith offset printing, black-line printing and mimeograph work. A summary of the 1945 work is given in the following table:

PHOTOGRAPHIC, MULTILITH, BLACK-LINE AND MIMEOGRAPH WORK

Item	North-western Region	Sugar Pine Region	Pear Psylla Control	Total
PHOTOGRAPHIC				
Lantern slides, natural color	78			78
Films developed, rolls and packs	4		1	5
Films developed, field films	210			210
Copies, 5x7	26	6	123	155
8x10	1		6	7
Printing, 4x5 or smaller		85	6	91
5x7	2,429	247	58	2,734
8x10		24		24
9x11	69	25	98	192
Enlarging, 5x7			67	67
11x14		6	11	17
14x17			15	15
30x40			11	11
Total Items	2,817	393	396	3,606
MULTILITH				
Copies	35	199	6	240
Plates made	35	136	4	175
Cards printed	800	3,600	11,800	16,200
Cards printed, reverse	800	3,600	11,800	16,200
Total cards	1,670	7,535	23,610	32,815
Paper printed	18,050	36,050	12,800	66,900
Paper printed, reverse	14,000	21,000	2,000	37,000
Total paper	32,050	57,050	14,800	103,900
Total Items	33,790	64,920	38,420	137,130
BLACK-LINE PRINTER				
Total maps printed	684		2,150	2,834
MIMEOGRAPH				
Total paper	16,085			16,085
Grand Total All Items	53,376	65,313	40,966	159,655

B. Educational Section

A conscientious effort is made by all members of the permanent staff to give comprehensive information concerning the blister rust problem to the personnel of the various camps. As the workers are gathered from all parts of the country, a wide dissemination of information is thus secured. This is a part of on-the-job training intended to give the workers a fundamental understanding of their jobs.

1. Bulletins and posters. Literature was made available to all camp personnel. One hundred eighty-six bulletins and pamphlets were passed out to persons calling at the Spokane office.
2. Talks, slides and motion pictures. A narrative has been prepared for the western Blister Rust motion picture, revising it for a sound film. An outline for a training film depicting the methods and techniques of the eradication job has been worked out. The western Blister Rust film will be used to give the workers an over-all picture of the job. The training film will show them how to do the job.

During the past season the western film was shown in 37 Bureau and Forest Service camps, and to 5 outside organizations by the photographer. In all, the picture was shown to audiences totaling 2,505 people.

At the county fair in Coeur d'Alene, by using the Balopticon, a series of blister rust slides was shown to a large number of people.

APPROPRIATIONS
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
NORTHWESTERN REGION OF BLISTER RUST CONTROL

Regular Appropriations

Fiscal Year 1945:

Project 3101.14 (Administrative)	\$97,675.00	
Project 3103.14 (Cooperative)	<u>64,870.00</u>	\$162,545.00

Fiscal Year 1946: (as of 12/31/45)

Project 3101.14 (Administrative)	\$92,000.00	
Project 3103.14 (Cooperative)	<u>210,000.00</u>	\$302,000.00

Contributed Funds (deposited with U. S. Treasury)

Clearwater Timber Protective Association	\$ 6,413.72	
Potlatch Timber Protective Association	5,174.28	
Priest Lake Timber Protective Association	<u>4,235.26</u>	\$ 15,823.26

TABLE 1

FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL,
CALENDAR YEAR 1945, REGULAR APPROPRIATIONS

Project		Salaries	Expense	Total
January 1 to June 30, 1945				
I	Planning, Coordination, Technical Direction			
	1.1 - Clearwater Operation, Idaho	\$ 8,827.48	\$ 1,545.19	\$10,372.67
	1.2 - St. Joe Operation, Idaho	10,793.94	1,493.93	12,287.87
	1.3 - Coeur d'Alene Operation, Idaho	1,761.80	48.78	1,810.58
	1.4I - Kaniksu Operation, Idaho	7,050.16	1,590.95	8,641.11
	1.6C - Cabinet Operation, Montana	785.66	61.68	847.34
	1.6K - Kootenai Operation, Montana	1,178.50	92.52	1,271.02
	1.7G - National Park, Glacier	274.18	54.00	328.18
	1.7R - National Park, Rainier	176.18	37.25	213.43
	1.7Y - National Park, Yellowstone	196.02	124.89	320.91
	1.A - Office Maintenance	9,157.54	2,666.65	11,824.19
	1.B - Supervision	5,128.20	226.87	5,355.07
	1.C - Education and Information	3,284.26	157.00	3,441.26
	1.D - Control Investigations	272.04	26.78	298.82
	1.E - Methods Development		6.79	6.79
	Total, Project I, Jan. 1-June 30, 1945	\$48,885.96	\$ 8,133.28	\$57,019.24
III	Cooperative Ribes Eradication on State and Private Lands			
	3.1 - Clearwater Operation, Idaho	2,530.12		2,530.12
	3.2 - St. Joe Operation, Idaho	1,287.12		1,287.12
	3.4 - Kaniksu Operation, Idaho	2,154.16		2,154.16
	Total, Project III, Jan. 1-June 30, 1945	\$ 5,971.40		\$ 5,971.40
July 1 to December 31*, 1945				
I	1.1 - Clearwater Operation, Idaho	4,472.27	336.40	4,808.67
	1.2 - St. Joe Operation, Idaho	6,143.66	682.81	6,826.47
	1.3 - Coeur d'Alene Operation, Idaho	1,326.21	106.78	1,432.99
	1.4 - Kaniksu Operation, Idaho	**1,008.57	256.78	1,265.35
	1.6C - Cabinet Operation, Montana	# 148.46	97.00	245.46
	1.6K - Kootenai Operation, Montana	# 148.46	97.00	245.46
	1.7G - National Park, Glacier	672.47	115.50	787.97
	1.7R - National Park, Rainier	442.05	91.85	533.90
	1.7Y - National Park, Yellowstone	1,059.01	260.78	1,319.79
	1.A - Office Maintenance	9,772.93	2,531.80	12,304.73
	1.B - Supervision	5,304.55	419.88	5,724.43
	1.C - Education and Information	2,051.84	135.60	2,187.44
	1.D - Control Investigations	877.11	48.54	925.65
	1.E - Methods Development		18.82	18.82
	Total, Project I, July 1-Dec. 31, 1945	\$33,427.59	\$ 5,199.54	\$38,627.13
III	3.1 - Clearwater Operation, Idaho	26,574.20	5,378.02	31,952.22
	3.2 - St. Joe Operation, Idaho	33,394.41	6,875.32	40,269.73
	3.4 - Kaniksu Operation, Idaho	20,455.77	4,499.31	24,955.08
	Total, Project III, July 1-Dec. 31, 1945	\$80,424.38	\$16,752.65	\$97,177.03

*Salaries and wages through December 29 only, the end of the 13th biweekly pay period, fiscal year 1946.

**Net amount after crediting repayment by the Forest Service of the salaries of H. A. Brischle and L. J. Easley for 7/1-29, 1945.

Net amount after crediting repayment by the Forest Service of the salary of A. S. Skoglund for 7/1-12/1, 1945.

TABLE 2

EXPENDITURES - 1922 TO 1945
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

<u>State</u>	<u>Regular</u>	<u>Emergency*</u>	<u>Cooperative</u>	<u>Total</u>
Idaho	\$1,845,905.41	\$3,472,982.33	\$334,190.82	\$5,653,078.56
Montana	237,294.68	285,153.90		522,448.58
Washington	<u>248,973.31</u>	<u>564,312.47</u>	<u> </u>	<u>813,285.78</u>
Subtotal	\$2,332,173.40	\$4,322,448.70	\$334,190.82	\$6,988,812.92
Colorado	11,852.04	67,437.96		79,290.00
Wyoming	<u>14,842.78</u>	<u>65,391.37</u>		<u>80,234.15</u>
Subtotal	\$ 26,694.82	\$ 132,829.33		\$ 159,524.15
Grand Total	\$2,358,868.22	\$4,455,278.03	\$334,190.82	\$7,148,337.07

* Emergency funds - ERA(WPA) \$3,775,781.16; NIRA(PWA) \$679,496.87

TABLE 3

SUMMARY OF EXPENDITURES FROM STATE AND
PRIVATE FUNDS, 1928 - 1945, IDAHO

Year	State	Private	Total
1928	\$ 2,518.55	\$ 2,264.32	\$ 4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
1941	7,542.73	15,756.40	23,299.13
1942	22,761.68	15,440.78	38,202.46
1943	12,252.13	386.68	12,638.81
1944	12,506.60	15,612.98	28,119.58
1945	6,287.68	5,111.03	11,398.71
Total	\$193,499.32	\$140,691.50	\$334,190.82

Organization of the Northwestern Regional Office - 1945

1. Regional Leader in Charge, H. E. Swanson, Pathologist
2. Assistant Regional Leader, F. O. Walters, Pathologist
3. Cooperative Local Control:
 - a. Clearwater Operation, Idaho:
Operation Supervisor, H. J. Faulkner, Forester
Checker Foreman, J. C. Gonyou, Field Aid
 - b. St. Joe Operation, Idaho:
Operation Supervisor, F. J. Heinrich, Pathologist
Operation Supervisor, W. F. Painter, Pathologist
Camp Superintendent, G. W. Schmaltz, Agent
Special Duty Assistant, R. E. Myers, Agent
 - c. Coeur d'Alene Operation, Idaho:
Operation Supervisor, M. C. Riley, Forester
 - d. Kaniksu Operation, Idaho-Washington:
Operation Supervisor, H. A. Brischle, Pathologist
Operation Supervisor, L. J. Easley, Agent
 - e. Montana Operation:
Operation Supervisor, A. S. Skoglund, Pathologist
 - f. National Parks, Washington, Montana, Wyoming:
Operation Supervisor, M. C. Riley, Forester
Operation Supervisor, C. M. Chapman, Pathologist
4. Projects:
 - a. Education and Information:
H. M. Cowling, Photographic Specialist
 - b. Methods Development and Control Investigation (BLR-1-6):
V. D. Moss, Forest Ecologist
J. F. Breakey, Pathologist
C. R. Stillinger, Pathologist
(Personnel assigned to Northwestern Region by H. R. Offord)
5. Business Administration and Clerical:
 - a. E. G. Schmidt, Administrative Assistant
E. K. LaPrey, Storekeeper
L. C. Miller, Automobile Mechanic
 - b. M. L. McWold, Administrative Assistant
M. Wilson, Clerk
 - c. M. M. McLean, Clerk-Stenographer
H. G. Thompson, Clerk-Stenographer
M. C. Yourt, Clerk-Stenographer
M. M. Stephens, Clerk-Stenographer
 - d. L. E. Klatt, Administrative Assistant, Personnel

Members of the Permanent Staff returned from Military Furlough:
COM John C. Gynn, December 2, 1945; Capt. Edward L. Joy, January 7, 1946.

Members of the Permanent Staff on Military Furlough: Lt. Homer J. Hartman;
Lt. Howard D. Langley; Major Albert L. Pence, Jr.; Yl/c Jean R. Pringle.